Volume XIII.
Number 2.

AUGUST, 1897.

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TEXTILE WORLD.

With which is Incorporated the

INDUSTRIAL RECORD

The Textile World's Complete Directory of Textile Establishments, the Mill Trade and of Large Buyers of Textile Fabrics is now ready for delivery. 360 pages, with 19 textile maps.

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Short and Long Chain Dyeing, Sizing and Drying Machines.

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Patent Automatic Clamp, Spring Clamp, Pin Chain.

Special Attention is called to improvements recently made in the **VIBRATORY MACHINES,** namely:

Spur gear driving in place of bevel gear (patented).

Crank plate for vibrating in centre of machine with forked rod grasping shaft at two points, giving evenness of motion and saving floor space (patented).

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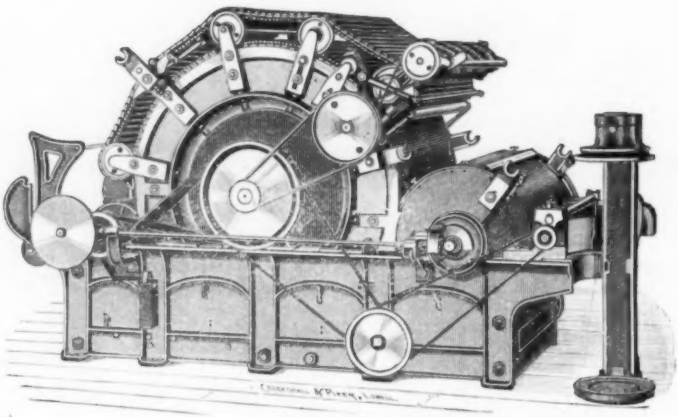

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Complete Equipment for Cotton Mills.

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once made a remark
to the following effect:—

"THERE IS
nothing so bad but that
some fool will praise it, and
nothing so good but that
some fool will condemn it."

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Has now reached a stage where condemnation brings the latter end of our quotation to mind. : : : :

We have no fault to find on the whole, but we know of many instances where mills who cannot help but realize the advantages of our loom, still pursue the fatal policy of delay.

Hesitation in the face of facts is not only unwise but in the present case expensive. A mill buying these looms when we were first ready to take orders would have the extra cost well near annihilated by this time.

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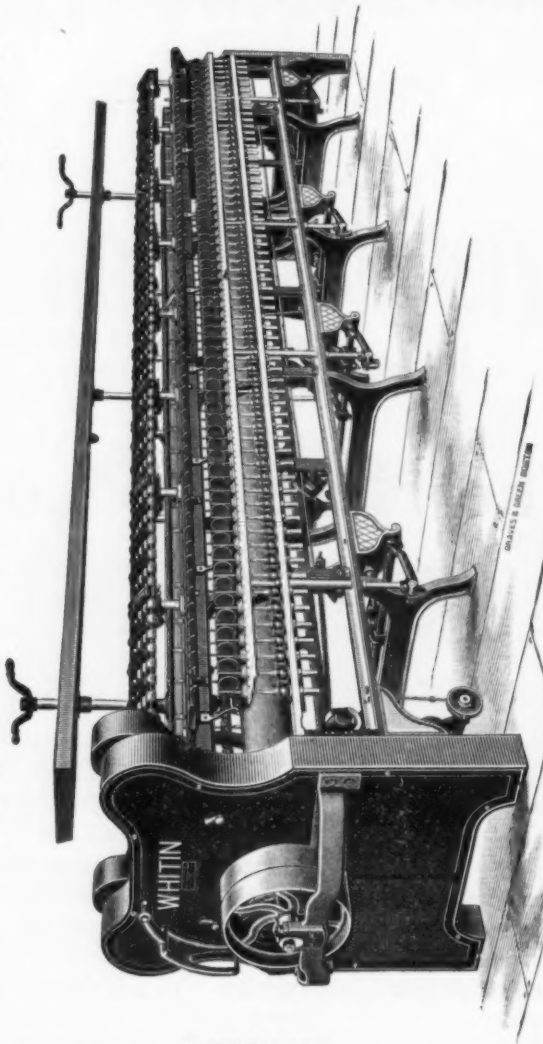

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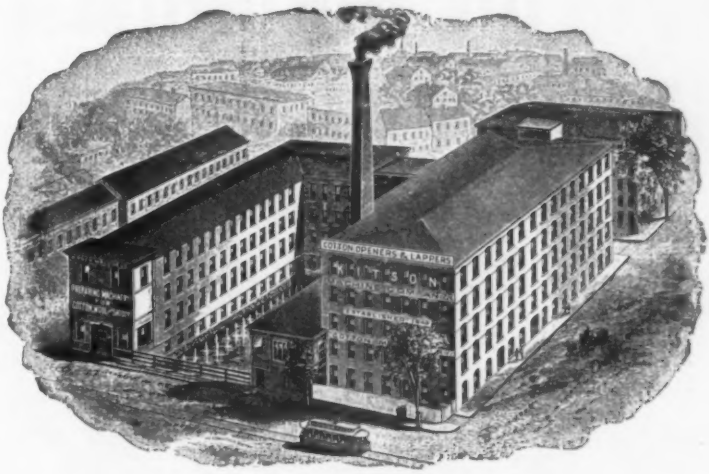

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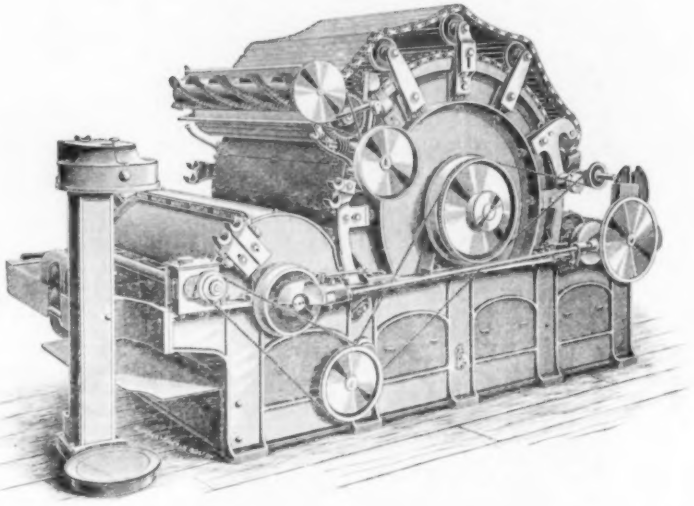

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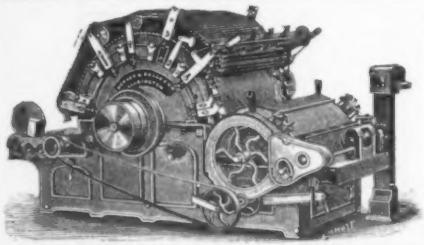

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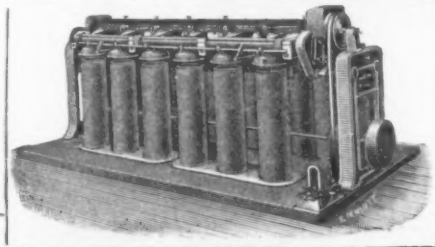

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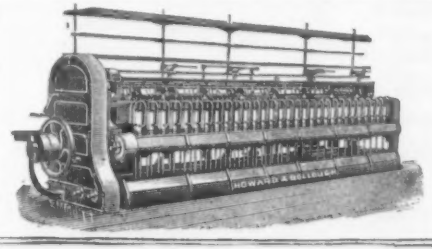

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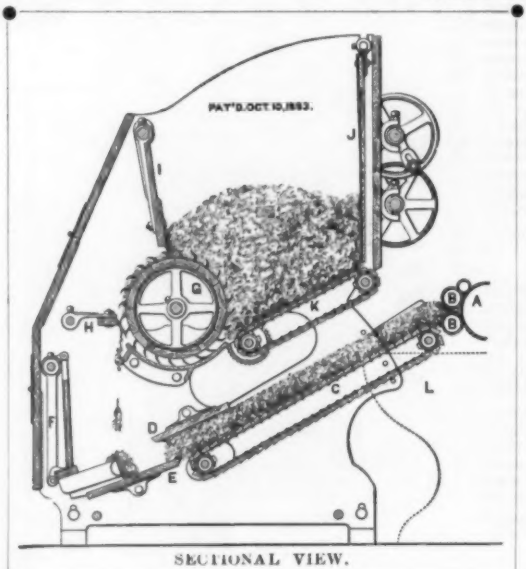

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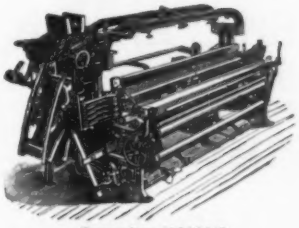

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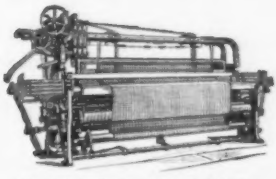

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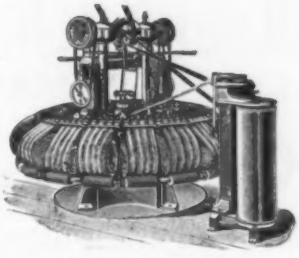
Wool



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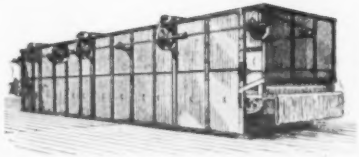

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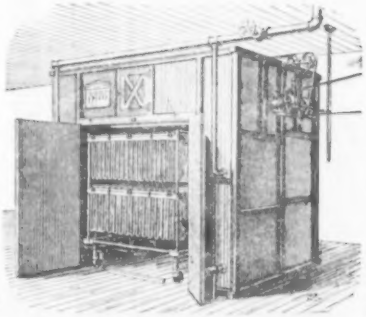

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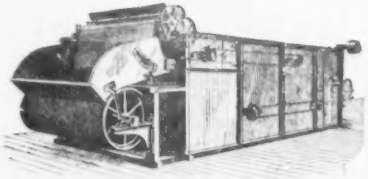

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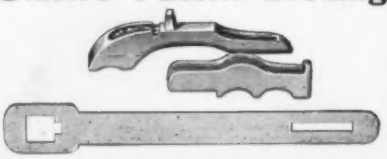
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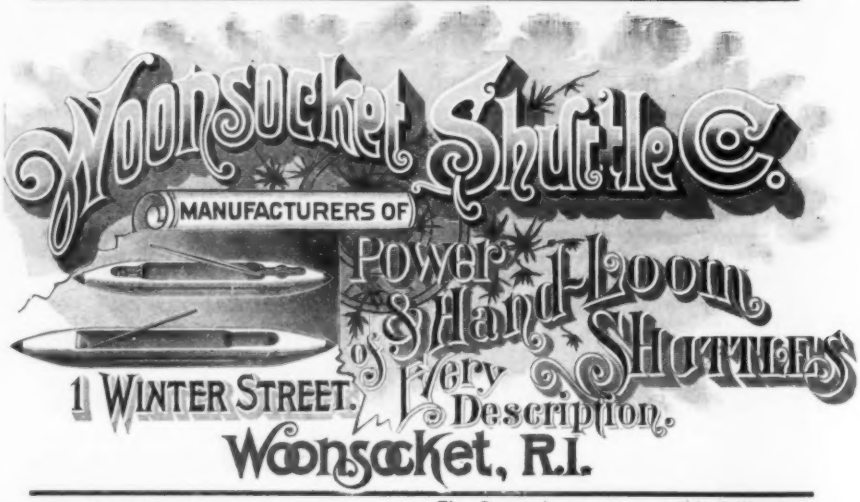

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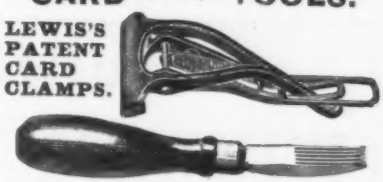

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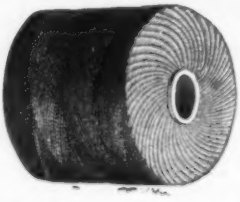

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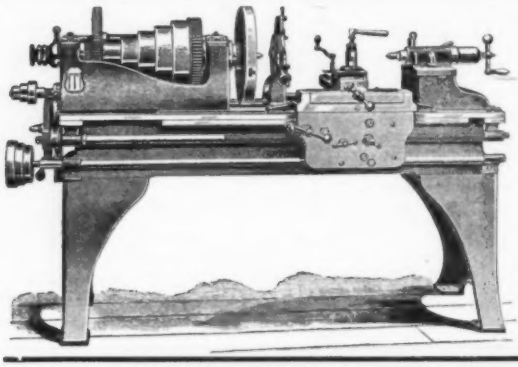

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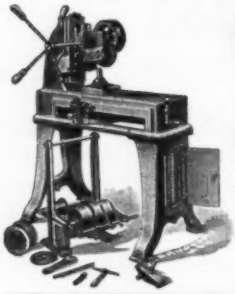

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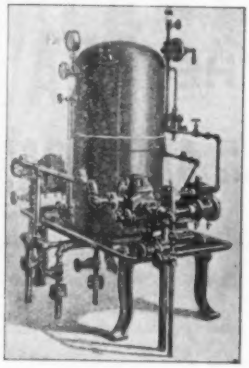

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Detailed information is given about each establishment, viz., the name of the company or firm, names of officers, agent, superintendent, what the mill makes, number sets of cards and combs (if woolen), number of spindles, number of looms, whether steam or water power, whether a dye house or not, who the selling agents are, or if the mill sells direct. In many instances it gives the name of the buyer of raw materials and supplies. To the travelling man, this directory is invaluable, as the maps give the location of the towns where there are mills, so that trips may be planned. The railroad connections are given, and distances may be estimated accurately from the maps.

IT ALSO HAS LISTS OF LARGE BUYERS OF TEXTILE FABRICS FROM FIRST HANDS INCLUDING MANUFACTURERS' SELLING AGENTS AND DRY GOODS COMMISSION MERCHANTS IN PRINCIPAL CITIES; THE MANUFACTURING CLOTHIERS, SUIT AND CLOAK MAKERS, JOBBERS, LARGE RETAILERS BUYING FROM FIRST HANDS. ALSO LISTS OF DEALERS IN RAW MATERIALS IN PRINCIPAL CITIES. BUYERS' INDEX OF TEXTILE MACHINERY AND SUPPLIES.

This directory is supplemented from month to month by the reports in the TEXTILE WORLD, and six months after its publication, a special statistical issue of the TEXTILE WORLD will contain supplementary data accrued in that time.

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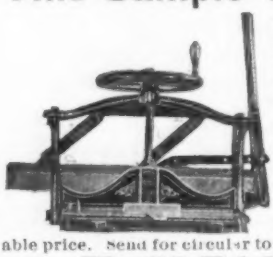

was designed by a manufacturer for his own use, and finding it better than anything he could buy for the purpose, he offers it to other manufacturers at a reasonable price. Send for circular to

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$1.50 per gallon. $1.40 per gallon in 5 gallon cans. Cans extra.

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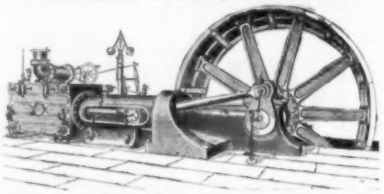

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—In every branch of textile designing there are certain principles which have only a limited application; thus, in designing for coatings, the successful effects are almost always those which are neat and small in character.

—Formerly, before the worsted yarn was used for the coating and suiting trades, the principal cloth for coatings was either doeskin, cassimere twill or whipcords, but since the introduction of the worsted yarn, the range of effects in coating fabrics has been very much enlarged.

—Serges should be set about 66 in. wide in the loom; the worsted warp and woolen weft coating, 68 in. to 72 in. wide, according to the amount of felting the cloth has to be subjected to, and the fine worsteds from 64 in. to 66 in. wide.

PATENTS

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Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents. GEO. DRAPER & SONS.

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List of Textile Patents Issued August, 1897.

Specifications and drawings furnished for ten cents each. Address W. S. Gavey, P. O. Box 222, Brooklyn, N. Y.

Apparatus for Dyeing, Etc. 585,752. T. Halliwell, Eccles, England.

Carding Engine. 587,267. J. T. Meats and J. S. Eaton, assignors to Mason Machine Works, Taunton, Mass.

Carding Machine Feeder. 586,458 G. D. Secor, South Bend, Ind.

Cloth Folding Machine. 587,017. J. H. Riley and E. O'Connor, Bury, England.

Cotton Chopper. 586,140. L. T. McKay, Barnesville, Ala.

Cotton Gin Feeder. 586,778. T. F. Marlow, Gadsden, Ala.

Cotton Gin Stop Attachment. 586,394. H. Rembert, Galveston, Texas.

Cotton Picking Machine. 587,201. P. P. Haring, Goliad, Texas.

Dyeing Apparatus. 586,117. T. C. Dill, Philadelphia, Pa.

Dyeing Black. 586,865. E. Von Portheim, Prague, Austria-Hungary.

Dyeing-Horse. 585,935. J. Knott, Paterson, N. J.

Electric Motor for Elevators. 585,760. J. D. Ihlder, Yonkers, N. Y.

Embroidery Hoop. 586,947. C. S. Bucklin, Baltimore, Md.

Feed Water Heater and Purifier. 586,498. B. F. Kelley, Brooklyn, N. Y.

Fringe Knotting Machine. 586,413. C. W. Arnold, Philadelphia, Pa.

Fulling Machine. 586,052. J. W. Millet, Dolgeville, N. Y.

Heddle Frame. 585,830. C. H. Niedner, Malden, Mass.

Knitting Machine. 586,315. G. D. Munsing, Minneapolis, Minn.

Lace-making Machine. 586,136. A. Mattisch, Vienna, Austria, Hungary.

Leno Motion for Loom Dobbies. 586,753. H. Bardsley, Providence, R. I.

Liquid Carbonizing Apparatus. 586,577. S. Twitchell, Philadelphia, Pa.

Loom. 586,233. A. Giroux, E. Providence, R. I.

Loom. 586,904. W. P. Kirkpatrick, Arrowsmith, Ill.

Loom-Lingo. 586,322. G. W. Stafford, Providence, R. I.

Loom Multiplier Mechanism. 586,374. W. Wattie, Worcester, Mass.

Loom Picker. 586,298. F. A. Wardwell, Methuen, Mass.

Loom Picker Strap. 585,837. O. A. Sawyer and M. M. Lahue, Lowell, Mass.

Loom Shuttle Box Motion. 587,086. T. Birchall, assignor to R. Atherton, Paterson, N. J.

Loom Temple. 586,288. L. S. Ludlam and J. A. Claus, Lowell, Mass.

Loom Shuttle Box Operating Mechanism. 587,087 T. Birchall, assignor to R. Atherton, Paterson, N. J.

Machine for Punching and Stacking Jacquard cards. 585,876. V. Royle, Paterson, N. J.

Machine for Working Fibrous Materials. 587,085. A. T. Atherton, Warwick, R. I.

Machine for Wrapping Cotton Samples. 586,065 C. H. Robinson, Anniston, Ala.

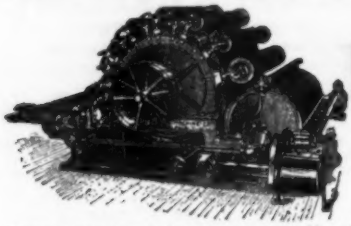
Machine for Wrapping Warp Chains. 587,194. E. T. Garsed, assignor of one-half to C. Cone, Greensborough, N. C.

Magneto Spindle. 586,790. A. Gartner, Paterson, N. J.

Printing and Mercerizing Cotton. 586,750. J. Weiss, Heidenheim-on-the-Brenz, Germany.

Process of and Apparatus for Dyeing. 11,620. L. LeBlois and G. Picenl, Elbeuf, France.

Roller Baling Press. 586,574. J. F. Swinnerton, St. Louis, Mo.



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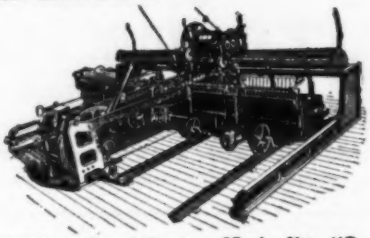

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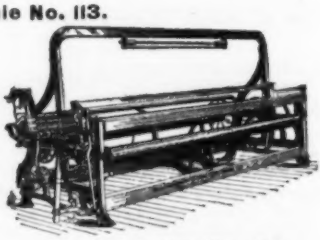


Blanket Loom No. 128.

Seed Cotton Elevator and Cleaner. 586,906. G. Lemoine, Pawtucket, R. I.

Silk or Thread Package. 586,121. J. P. Fraley, Philadelphia, Pa.

Spindle. 586,789. A. Gartner, Paterson N. J.

Spindle. 586,791. A. Gartner, Paterson, N. J.

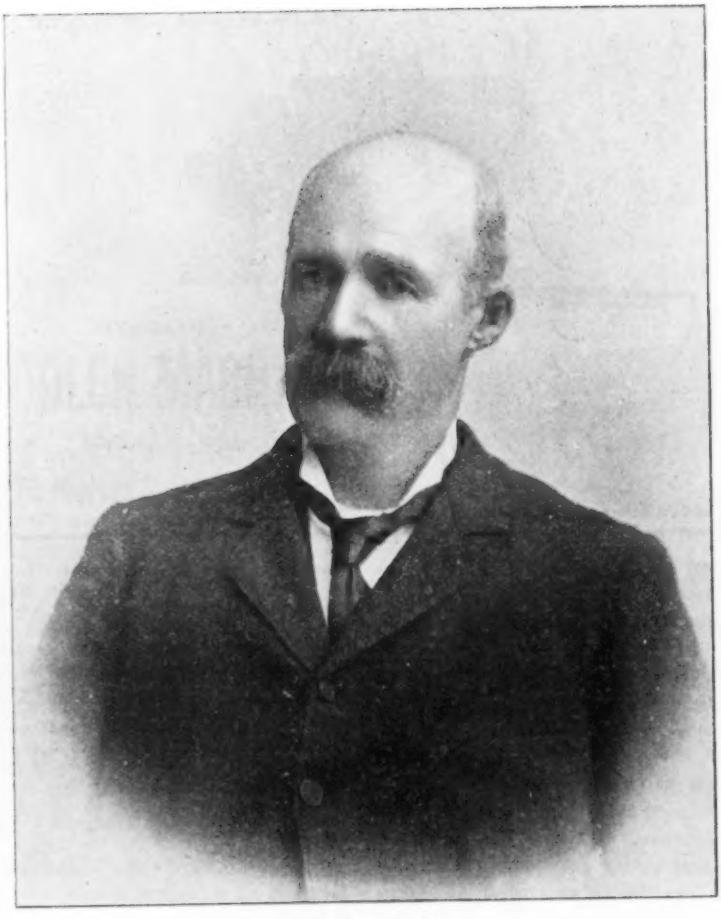
Thread Guide. 587,098. C. Koffinke, Hopedale, Mass.

Warp Beam Brake for Looms. 586,745. O. S. Pierce, Pawtucket, R. I., and A. J. McAllen, Central Falls, R. I.

Southern Competition.

The New York "Tribune" prints in one of its recent issues, on its editorial page, a note saying, "The stock-holders of the Savannah (Ga.) Cotton Mills, have decided to shut down the mills and advertise the property for sale, as they have been running at a loss for the last three years." In the same issue of this paper, in fact on the next page, is an open letter, headed "Alarmed at Southern Competition." This is of the usual tenor of the visionist, and yet undoubtedly states many of the leading motives which have made some of the Southern mills apparently successful. Between these two opinions, one can choose. It reminds us of what Josh Billings said, however, that it is "better to know less than to know so much as aint so." Both the statements, however, illustrate the difficulty of stating a precise truth in brief form. The Savannah Mill has had disadvantages which are not apparent on the face of a simple newspaper statement.

—A great deal of carelessness is shown in the selection of land upon which to grow flax, although flax is a wonderfully hardy plant, and will grow almost anywhere; still, in order to get a paying crop, some selection and care must be made in the choice of the land, and in a great many cases this is the cause of failures.



THOMAS KAY.

TEXTILE WORLD.

Vol. XIII. AUGUST, 1897. No. 2.

THOMAS KAY.

Thomas Kay, president and general manager of the Thomas Kay Woolen Mill Co., incorporated, was born at Applebridge, Yorkshire, England, in June, 1837. He is descended from a long line of woolen manufacturers, and was early trained in the industry, which he began to systematically learn at the age of nine years, at Shipley, England, where he spent two years in the spinning department and six years in the weaving department in learning the process and methods of worsted manufacture.

In 1857, he came to America and turned his attention to the manufacture of woolen goods, finding employment at Cazenovia, New York. At the end of one year he returned to England to perfect himself in this line, and again visited the United States in 1859.

He secured a position with the Smith Woolen Mfg. Co. at Philadelphia, Pa., and afterwards worked at Trenton and Newark, N. J. In 1863 the officers of the Brownsville Woolen Mill, at Brownsville, Oregon, sent for him to come and take charge of their weaving department. He accepted the offer, and went to the State upon a three years' contract, retaining the position until the burning of the mill in 1865, when he went to the woolen mill at Dallas, where he filled the place of superintendent for one year. From there he went to Ashland, where he remained for four years as superintendent. He then went to Salem, and took charge of the weaving department of the Willamette Woolen Mill, established in 1850.

In the meantime the mill at Brownsville had been rebuilt and started up, but failing to make a success, had been closed, and remained idle for a number of years. In 1873, Mr. Kay and two other parties leased this mill for two years, and at the end of that time they organized a company and bought the mill and machinery, and continued the business. Mr. Kay was superintendent and a member of the board of directors. This mill was conducted very successfully until 1888, when the company dissolved and sold the business out.

Mr. Kay then visited his old home in England, being the first long vacation he had taken within thirty years. He was accompanied by his wife, and after a most pleasurable tour returned to Oregon, when he accepted a proposition to build a two-set woolen mill at Salem, Oregon, and in July, 1889, the Thomas Kay Woolen Mill Co. was incorporated, with Mr. Kay as president and general manager. In August, the same year, he began the construction of the buildings, and in February, 1890, the mills started in the manufacture of cassimeres, tweeds, flannels, blankets, etc. From this time until the morning of Nov. 18, 1895, when this mill was totally destroyed by fire, it never missed a day or night's run, except when actually necessary for repairs. Not being able to supply the growing demand for their product, they bought, in January, 1895, a three-set mill, located at Waterloo, Oregon, which has ever since been operated day and night.

The burning of the Salem mill was a heavy blow to Mr. Kay and his asso-

ciates, as they were very busy on large orders, with an unusually large stock of material in the mill, all of which was entirely consumed. Loss $70,000; insurance $20,000. The people of Salem felt the loss of the mill keenly, and having all confidence in Mr. Kay as a manufacturer, insisted that the mill should be rebuilt at once, and as an inducement offered to take $25,000 in stock, which proposition was accepted, and the capital stock increased from $75,000 to $100,000. The work of rebuilding began at once in the erection of a brick mill, 60 feet by 136 feet, two stories and a basement. This was completed and furnished with two sets of woolen and one of worsted machinery, which was put in operation in the fall of 1896, and is now running day and night.

Mr. Kay was married in the old Carvela Church, near Leeds, England, in April, 1857, to Miss Ann Slingsby, and of the union ten children have been born, five of whom are living.

The Multiple Cotton Gin and the Round Bale.

Editor Textile World

There is on exhibition at the Tennessee Centennial Exhibition an improved cotton gin, which is claimed to be superior to all others; and as it is a prime factor in the production of the round cotton bale, I desire, through the medium of your paper, to bring it to the attention of all who are interested in an improved condition of cotton for spinners' use. The "multiple gin," as it is called, is the first one of the kind ever built. It is the invention of the Walburn-Swenson Company, of Chicago, and contains four saw cylinders, to which can be added any desired number, and made of any desired size. It requires only half the number of brushes, and consequently requires less power. The seed cotton is all fed at one place, and the lint is discharged at one place. All complicated seed conveyers are dispensed with. The seed cotton is fed underneath, not on top of the saws, as in all other gins. Consequently all heavy foreign substances fall to the bottom of the carrier and do not come in contact with the saws, which greatly lessens the danger of fire. No stationary ribs are used, so that there can be no clogging and consequent damage to the fibre. The ginning does not take place from a tight roll, but from loosely packed cotton, which is in constant circulation, and the full length of the fibre is preserved. Unripe bolls and other foreign matter, will all accumulate at the end of the apron, and be readily discharged, without coming in contact with the gin saw. The moting is all done at the end of the gin and is under perfect control by adjustable slides. This gin takes but a fraction of the space occupied by the old gins, and does away with the long and expensive flues, necessary with the old system. One man can easily operate one of these gins, regardless of its size. The setting and driving of this "multiple gin," is much simpler and cheaper for the same capacity, than with the old system. The use of this gin will make smoother, cleaner cotton, and greatly enhance its value to producer and manufacturer.

With this gin, giving smooth, clean cotton, with the fibres laid straight and unbroken, and with the tare less than five pounds per bale, weights holding out to a fraction of the invoice, I am confident that the round bale has reached perfection, and will be taken by our manufacturers in preference to the flat bale.

In the matter of weights I would state that, on ten thousand bales sold here in Boston, there has been no loss, over the two pounds guaranteed, in any instance. I had a bale shipped from St. Louis to the Providence Exposition. It was there unrolled, to the perfect satisfaction of all who witnessed the operation, the cotton packed in sacks, shipped to Boston, re-shipped to Lawrence, re-weighed there, and the loss was only one pound from the St. Louis weight.

W. H. PERKINS.

Textile World

WITH WHICH IS INCORPORATED THE

INDUSTRIAL RECORD,

COMBINING

THE AMERICAN TEXTILE, THE DESIGNER AND WEAVER, WARP AND WEFT, THE WOOLEN MANUFACTURER

AND THE

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THE TEXTILE WORLD'S COMPLETE DIRECTORY OF THE TRADE.

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Containing full information about all

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also lists of

Dry Goods Commission Merchants,
Dealers in Raw Materials,
Manufacturing Clothiers,
Suit and Cloak Makers,
Jobbers and Large Retailers,
Buyers from First Hands.

Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

MONO-TECHNIC EDUCATION.

The discussions on the proper methods of teaching technology, in any line of trade, that were had at the International Congress of Technical Education, recently held in London, are destined eventually to bear fruit of much importance. We wish it were possible to devote sufficient space in this magazine to a full report of some of the papers and comments thereon, that were presented at the congress. The importance of teaching pure and applied chemistry was a prominent feature in the proceedings. The subject of chemistry, as we have before remarked in these columns, is destined to become far more prominent in the curriculum of textile education than heretofore. Its value is growing in the appreciation of teachers and manufacturers. There is no branch of industrial enterprise that has met with such signal and varied success as that dependent upon chemical research. Matter that not many years ago was regarded as of no more worth than refuse, has been found contributing to the economy of manufacturing more than much whose utility had become established. We are still at the beginning of a wonderful development, that will become more manifest and more magnificently unfolded, as time goes on.

There are different opinions concerning the teaching of applied chemistry, but all who are capable of discussing the question seem to agree that practical chemistry should not be taught to the neglect of the theoretical; in fact, it is generally admitted that success in applied chemistry is dependent upon the acquisition of a sound theoretical knowledge. As Dr. O. N. Witt, professor of chemical technology at the Royal Polytechnical School, of Berlin, truthfully says: "It is a complete scientific education which must come to our young chemists in order to enable them to be successful in their industrial career." This means that whatever may be the destiny of the student, his

education should be strictly scientific, and theoretical as well as practical. We think it is a fairly recognized fact that special technical education in applied chemistry is not a proper foundation for our technical schools, whether in the line of textiles or otherwise. We mean by this that a one sided preparation is not desirable, a matter that the faculty of the textile school at Philadelphia have fully considered and appreciated, as noted in another article in this issue. Specialization, to the exclusion of a general comprehension of the subject, whether chemical or otherwise, should be looked upon with disfavor. A seeming exception may be made of schools that are located in centres of single industries, like those, for instance, at Fall River and New Bedford, in the textile line; but in order that schools of this character should graduate men who are to become originators of progressive ideas, they should have a complete and efficient instruction in general and theoretical chemistry.

Our remarks affecting this particular line of study can be applied with equal force to anything that is taught in our technical schools. Tuition in any study would lose its importance if it did not also stimulate research. This phase of the teaching of chemistry was dwelt upon with a great deal of earnestness by all of the speakers at the Congress. Original research is at the bottom of industrial progression.

There was an important idea presented in a remark made by one of the speakers that "only after having acquired considerable skill in chemical manipulation should the student begin to do analytical work." This was in a measure the advocacy of teaching from the effect to the cause, in preference to the common system of teaching from cause to effect. As better explained, the demonstration should be first exhibited to the student, and then from the demonstrated effect should be shown the cause. This is further illustrated in the present adoption of the method of teaching modern languages, first orally, and then allowing the student to master the grammer afterwards. Those who have followed the system of education that is practiced in Massachusetts and elsewhere in the New England States, will appreciate this, when it is stated that the memorizing of the alphabet is never imposed upon a pupil, but that the alphabet is learned intuitively by becoming familiar with the letters on the blackboard in words of common use among children. This is further noted in the present methods of teaching arithmetic, where rules are ignored until the examples are practiced. The methods of teaching to-day are almost diametrically opposite to those existing a generation ago.

What we really need from our textile schools are not specialists so much as those who have a comprehensive idea of the various subjects qualifying them to enter upon their industrial pursuits with the greatest profit. That is to say, any science that is taken up should be studied as a whole as well as specifically, and that practice should not be separated from theory, nor theory from practice. Mono-technic schools should be advocated with great caution, and the excuse for their existence would be in localities where there is but one particular industry; but whatever is undertaken in our technical or textile schools should have in view the inculcation of ideas that will lead to original research.

THE TARIFF.

There have been some important changes made in the new tariff, as compared with previous acts, in the textile schedules. There are several indications showing the innovations that have been made in manufactures, even within the last four years, and a number of articles have attained sufficient importance to warrant enumeration in some of the paragraphs. For instance, crochet, darning and embroidery cottons are named as deserving of this special dis-

tinction. Cotton thread on reels has now a distinct standing, the same as thread on spools, though under the 1894 act, importations of thread on reels were classified for appraisement with thread on spools.

Lappet weaving is for the first time recognized in tariff legislation, and carries an extra duty of one to two cents per square yard, in addition to the duty that it has to bear as cotton cloth. This one thing, alone, shows the changes that have been in progress within the last few years. Ramie, for the first time, figures in tariff legislation, in the same category with flax. The legislation affecting this fibre is more prospective than anything existing at present. Chinese, Japanese and Indian straw matting is for the first time subject to special tariff rates, the duty being placed upon this merchandise to satisfy the demands of our carpet manufacturers, with the evident purpose of curtailing the use of the imported article, and improving the trade for the domestic product made of wool.

The whole of the flax schedule has been carefully revised and extended in its application.

We find in the woolen schedule that merino wool, or wool of the first class, has new associates in certain kinds of wool that have heretofore been classed with carpet wools. We anticipate that trouble will arise from that provision of the tariff imposing a duty on wools of the third class imported in condition for use in carding or spinning, of three times the duty to which they would otherwise be subjected. It will be found, we fear, quite an undertaking to determine what wools are in proper condition for carding or spinning. Skirted wools stand, practically, in the same position as heretofore, and will prove satisfactory to manufacturers. Common goat's hair comes in free, but is dutiable when manufactured. Angora goat's hair is dutiable the same as wool. There is an inconsistency, if not an inequity, in the imposition of the same duty on wool that has been advanced in any manner by any process beyond the washed or scoured condition, as upon manufactures of wool. This duty should correspond more with the duty on yarns, though practically it will make no difference.

SHORT OF COTTON.

As is well known, the cotton mills of the South Atlantic States, and especially those of North Carolina, are suffering from want of cotton obtainable within their immediate neighborhoods, sufficient to run on full time. Many of the mills have been obliged to seek cotton in distant markets, as New York and New Orleans. The reason for this shortage of the raw material is largely due to the rapid growth of the cotton manufacturing industry in the South. In connection with this, it may be interesting to examine the following statistics, showing the crop of 1895-96 in the States of Georgia, South Carolina and North Carolina, and also the consumption of cotton by the mills of these respective States:

State.	*Crop 1895-96.*	*Consumption.*	*Exports from Sea Ports*	*Consumption Percentage of Crop.*
Ga.	1,079,000	210,844	690,000	20
S. C.	664,000	254,698	358,000	38
N. C.	384,000	232,072	193,000	60
Total	2,127,000	697,614	1,241,000	33

It will be observed that the mills of Georgia consumed cotton to the extent of 20 per cent. of the crop of the State, those of South Carolina, 38 per cent., and those of North Carolina, 60 per cent. The average consumption of the mills, in all these States, was 33 per cent. of the total crop. In addition to this consumption, a large portion of the crop is sent outside the State, by sea and overland. The export figures, as given in the accompanying table, will show the amount of cotton that is shipped from the seaports of these States, much the larger portion of which is the growth of the South Atlantic States. Local consumption of 60 per cent., as noted in regard to North

Carolina, is a heavy draft upon the growth of the State, and practically means that the mills are forced to seek outside sources of supply. When this becomes the case, more fully, with the mills in all of these States, the advantages that the Southern mills have in obtaining their cotton will cease to exist, as compared with the facilities enjoyed by the New England mills.

IMPROVEMENT.

There is an evident improvement in business throughout the country. Business and industries are now adjusting themselves to the new conditions created by a new tariff law, and there is every reason to expect rapid strides on the road to prosperity. The only thing that appears to cast a shadow over the situation, is the labor difficulties that exist in the coal and iron regions of the Middle States. The cotton manufacturing industry at the present time is not in a particularly healthy condition, but this is not expected to last long. The woolen manufacturing industry is booming. The discovery of gold in Alaska will probably have a stimulating effect on trade; and should the production prove at all large, the tendency will be to make everything active, and have an effect upon business like that following the discovery of gold in California, in 1849. The only thing to be feared is that the stimulation will be so intense that a financial crash will follow in the course of a few years.

BADLY PUT-UP WOOL.

We think if the wool growers of the West would be more careful as to the condition in which they put up their fleeces for marketing, they would not feel the present necessity of such a heavy tariff on the foreign article in order to obtain a living price for their product. It was a disgrace to the wool growers of this country, and especially to those east of the Mississippi River, the way in which fleeces were put up for exhibition at the World's Fair, at Chicago; and notwithstanding this matter was brought to the attention of the wool growers, by the judges and others that examined the fleeces, it does not seem as if they had profited by the suggestions made to them, to be more circumspect and honest in the way that they market their clips. It would be well if they took a few lessons from the methods pursued by their foreign competitors. We notice in our Western exchanges that many complaints are made of the carelessness with which wool growers put up their fleeces. One buyer, who handles in the neighborhood of 100,000 pounds per year, writes that he finds lots of wool, which, upon examination of the fleeces, are found to contain, inside, locks from which could be wrung water, unwashed tags, and other extraneous matter. The use of an excess of twine in doing up fleeces is, also, a disgrace to the wool growing industry of this country.

—During the first six months of this year, the exports from the district about Chemnitz to the United States were especially large in cotton hosiery, which forms the principal article of export to this country. The total amount of the exports of cotton hosiery from Chemnitz to the United States amounted to over $4,300,000, two-thirds of which were exported within the first six months of this year.

—The estimated tariff revenue to be derived under the new act, is about $275,500,000. Of this, $11,300,000 is estimated as coming from cotton manufactures; $19,800,000 from flax, etc., manufactures; $72,100,000 from wool and manufactures thereof; and $14,300,000 from silk and silk goods.

—The exports of textile machinery from England continue to be heavy, the value of such exports amounting to about $16,000,000, for the six months ending with June, 1897. The larger portion of these exports went to the

British East Indies, Germany, France and Japan. The latter country has become an active and profitable customer for English machinery, amounting for the above six months to one eighth of the whole. The exports to the United States were comparatively small.

A TARIFF ACT PROBLEM.

An important problem is now before the Treasury Department for solution, concerning the exact time when the new tariff act went into effect. The meaning of the enacting clause is wrapped in more or less abiguity. It will require a decision from the Supreme Court of the United States before the question is finally settled. The language of this clause differs materially from that of former acts, in the use of the phrase "after the passage of this act." Previous acts have designated the day, instead of the implied time of the day, when the act should go into force. There are several points that will have to be considered for a correct interpretation of the intent of Congress, and the meaning of this portion of the present tariff act.

In the first place, previous acts have stated "that on and after the first day," of "August, 1894," for instance, there shall be levied duties, while the present act has the phrase "that on and after the passage of this act." There is one point to be noted here, which is, that the Senate, in which the House afterward concurred, changed the phraseology of the present act form, "that on and after the first day of May, 1897," to "on and after the passage of this act." It will be noted that it does not read "on and after the day of the passage of this act." In connection with this, it may be well to bear in mind the wording of section 33 of the present act, as follows:—"that on and after the day when this act shall go into effect, all goods, etc. previously imported . . . shall be subjected to the duties imposed by this act, and to no other duty;" also to the wording of section 34, "that the repeal of existing laws or modifications thereof, embraced in this act, shall not affect any act done, or any right accruing or accrued, or any suit or proceeding had or commenced in any civil case before the said repeal or modifications, but all rights and liabilities under said laws shall continue, and may be enforced in the same manner as if said repeal or modifications had not been made." The phraseology of these three sections will have to be reconciled by the court. We can see no other way out of it.

The intent of Congress will have to be considered the same as was done when the question as to the time when the 1894 act went into force, was considered by the Treasury Department and the courts. The course of any litigation that may be instituted by importers will be first an appeal to the Board of General Appraisers; then, in the event of an unfavorable decision, to the Circuit Court; thence to the Circuit Court of Appeals; and finally to the Supreme Court, where it will no doubt eventually come. This will become necessary, owing to the instructions that were given by the Treasury Department to the Collectors of Customs, immediately after the approval of the act by the President, to the effect that the new act took effect at midnight of July 23, 1897. In these instructions reference was made to a decision of the Board of General Appraisers dated Sept. 26, 1894, referring to the time of going into effect of the act of 1894.

It should be borne in mind that the President did not sign the act of 1897 until a few minutes after 4 o'clock, July 24, or after the close of the official day at the Custom House. This fact would impress one that there was a possible intent on the part of the President not to approve the act so as to apply to the imports entered July 24. If it can be established that the act was not in force on that day, previous to the hour of approval, by the courts of the United States, as at Boston, for instance, it is equally clear that it was not in force at San Fran-

cisco, though the hour there was only one o'clock in the day, for it is well known that a law that is in force in one part of the country must at the same identical time be in force in all parts.

Of course, the only thing that the Treasury Department can do, in order to bring this question before the courts, is to instruct collectors as it has already done, for no importer would appeal from a lower to the enforcement of a higher duty. Further, the Treasury officials are justified in taking a view favorable to the government, and least favorable to the importers. It is understood that the Treasury Department relies upon a Supreme Court decision affecting the interpretation of the National Bankruptcy Law, wherein a fraction of a day is unrecognized, but this is looked upon as not a parallel case. There has been no question before the courts of this nature applicable to custom cases.

There is a fiction of the law that recognizes the position taken by some, that in law there are no fractions of a day, and that a day exists in whole, and not in part. An opinion, however, is in existence, from Justice Story, which holds that fractions of a day are to be considered in law, and that the precise hour at which a bill is signed is valid evidence as to the time when an act went into force. Justice Story remarked in his opinion that "I am aware that it is often laid down that in law there is no fraction of a day, but this doctrine is true only in a limited sense, where it will promote the right and justice of the case . . . . . Common sense and common justice equally sustain the propriety of allowing fractions of a day, whenever it will promote the purposes of substantial justice. . . . . In every case of a bill which is approved by the President, it takes effect as a law only by such approval, and from the time of such approval. . . . . The approval cannot look backwards. . . . . In all cases of public laws, the very time of the approval constitutes, and should constitute, the guide as to the time when the law is to have its effect, and then to have its effect prospectively, and not retrospectively." According to this opinion, the time of signing a bill maybe properly looked into, when justice requires it. The decision of the courts as to the time when the 1894 act went into force, has an important relative bearing upon this question.

There is a decision of the United States Supreme Court rendered by Justice Hanlan in the October term of 1881, (U. S. Reports, S. C. Otto 14, 104) in the case of Louisville vs. Savings Bank, affecting certain bonds, and the detachment of coupons therefrom. It may be well to note the language of Justice Hanlan, which is as follows:— "It cannot be doubted that the courts may, when substantial justice requires it, ascertain the precise hour when a statute took effect by the approval of the executive. . . . . We look to the final act of approval by the executive to find when the statute took effect, and when necessary, inquire as to the hour of the day when that approval was in effect given."

It should be borne in mind, as a general rule, that an importer, or anyone else, cannot be deprived of his vested rights,that is to say, in this particular case, that if an importer had rights on the morning of the day when the act was approved by President McKinley, they could not, in justice, be abrogated by anything transpiring subsequently that would act retrospectively to his injury. If an importer went to the collector on the morning of July 24, for instance, and claimed his merchandise, and offered to pay the duty thereon, the collector had no legal right to consider any other law in existence except that of 1894. The question now is, had the importer any vested rights here that should be respected? It must be admitted, on the other hand, that there are plausible arguments supporting the right of collecting of this importer the higher duties imposed by an act that came into existence subsequent to the time that he complied with the

statutes then in force, for it has been settled that, in tariff matters, Congress can pass a retroactive law; but Congress must so express its intention before the law goes into effect, The question therefore is, did Congress so express its intention affecting the act of 1897? It would be well to consult the opinion of Judge Somerville, one of the United States General Appraisers, on the question as to the date of going into effect of the act of Aug. 28, 1894. This opinion will be found in the Synopsis of Decisions No. 15, 381, dated Sept. 26, 1894. This decision was a remarkably able one, and covered points that have arisen since it was rendered, affecting the power of Congress to pass retroactive laws. The intention of Congress enters very largely into the opinion that was rendered by Judge Somerville.

We do not feel, at this time, capable of forming a definite opinion to our own satisfaction regarding this question, when the act of 1897 took effect. We are inclined to think, however that when the matter comes before the Supreme Court, the position taken by the government will not be sustained, but over-ruled, and that the act took place at the time that it received the approving signature of President McKinley, that is, some time after 4 o'clock, and, therefore, though in operation immediately thereafter, practically did not go into operation until the opening of the Custom Houses at the beginning of their official day, nine o'clock the succeeding Monday morning Should it, however, be decided that it did take effect at midnight Friday, or 12.01 o'clock Saturday morning, there will probably be little or no confusion as to what merchandise should bear the new tariff rates, because of the fact that the act was not signed until after the close of the Custom House official day.

IMPORTS OF WOOL MANUFACTURES.

We give, below, official statistics showing the value of the impor s of manufactures of wool for the six months ending June 30, 1897, and bring in comparison that of the imports for the corresponding months in 1896. The total value for the six months of 1896 was $21,577,055, and the total for the six months in 1897 was $33,623,862, showing an excess of 1897 over 1896 of $12,046,807, being an increase of 35.4 per cent. in 1897 over 1896. The total value for the twelve months ending June 30, 1896, was $53,494,400, while for the twelve months ending June 30, 1897, the value was $49,162,992.

VALUE OF IMPORTS OF MANUFACTURES OF WOOL.

	January.	*February.*	*March.*	*April.*	*May.*	*June.*
Carbonized	$.....	$ 6 814	$ 6,699	$.....	$.....	$.....
Carpets and carpeting	30,190	49,474	78,727	110,421	116,588	77,668
Clothing, etc., except shawls and knit goods	23,289	47,418	93,669	78,205	83,94 4	66 418
Cloths	1,062 212	1,16,500	2,131,702	3,385,514	1,728,516	2,176,929
Dress goods, women's and children's	1,452 946	1,607,535	1,109 040	2 214,633	2,241,243	2,741,669
Knit fabrics	48,592	87,284	198,728	356,707	255 594	3.3,424
Rugs, mats and wastes	241,956	230,969	657,719	1 446 251	926 449	725,055
Shoddy, mungo, flocks, etc.	533	1,861	197,580	700,603	415,289	247,510
Shawls	8,413	9,859	26,725	76,094	71,750	51,065
Yarns	49,569	47 990	101,361	204,023	180,724	145,230
All other	305,151	193,523	329,690	390,929	161,368	398,203
Total manufactures in 1897	3,122,853	3,468,133	4,591,610	8,963,470	6,181,425	6,996,371
" " 1896	6,289,031	5 352,410	3,929,214	2,194,778	1,625,408	2,286,214

An examination of these figures will show that 40 per cent. of the total value for the 12 months of 1895-96 was imported during the first six months of 1896, or the last half of that period, while for the fiscal year ending in 1897, 68.6 per cent. of the total value was

imported the first six months of 1897, or the last half of that period.

It will also be observed in these percentages, the effect of the new tariff upon imports; in the rush of merchandise into our ports, in order to receive the advantage of the lower duties prevailing under the 1894 tariff act. It will be further observed, in an examination of the monthly value of imports, that the increase for the six months in 1897 over the same period in 1896 was effected in the latter part of this period, when the changes in the tariff became assured. The January importations in 1897 were much less than those in 1896, and the same can be said of those in the month of February. In March, however, the custom house reports show a marked increase in the importations, which became much greater for the succeeding months of April, May and June.

IMPORTS OF WOOL.

We give, below, certain statistics showing the imports of wool, in quantities, for the twelve months ending June 30, 1896 and 1897, divided into six months' periods. We have been able to make up these statistics to the end of June, 1897, through the courtesy of the Treasury Department, Washington, who forwarded us the necessary statistical information. The importations, as will be observed, for the first six months of 1896-97, were comparatively light compared with the same period of the previous year. The last six months, on the contrary, show very heavy importations, in anticipation of the coming into operation of a tariff with duties on the raw material.

IMPORTS OF WOOL.

	1895-96.	*1896-97*
Six months ending Dec. 31	129,004,387	57,868,929
Six months ending June 30	101,907 086	292,983,097
Twelve months ending June 30	230,911,473	350,852,026

The importations for the last six months exceeded the total importations for 1894 95, a year of the heaviest wool importations in the history of the country, by 44,000,000 pounds. Even with the prospective increased consumption of wool by our manufacturing establishments, we have probably in hand enough foreign wool to satisfy the demand for the next eight or nine months. An examination of the figures will show that for the first six months in 1895-96, 56 per cent. of the year's importation took place, leaving 44 per cent. for the last six months, while in 1896-97, only 16.5 per cent. of the total importations occurred in the first six months, leaving 83.5 for the last six months.

The imports at the ports of Boston, New York and Philadelphia for the six months ending June 30, 1897, arranged according to the three classes, were as follows: 1st class, 177,598,053 lbs.; 2nd class, 24,060,394 lbs.; 3rd class, 78,395,539 pounds, making a total of 280,053,986 pounds. The imports at other places of entry amounted to 12,929,111 pounds, making a total, as above, at all places of entry of nearly 293,000,000 pounds.

EXPORTS.

The exportations of domestic merchandise for the fiscal year 1896-97 show a value of $1,032,001,300, being the largest in the history of domestic exports from this country. The value of exports in 1892, alone, approximated this amount, but that year, even, fell short of the year just closed by over $16,000,000. The comparative increase is not appreciated fully in these figures, because of the fact that the export prices of the commodities were much less in 1896-97 than in the year ending in 1892. With this it may be stated that the exports of domestic manufactures were in excess of any previous year in the history of the country, or 26.78 per cent. of the total exports of the year. The increase in the value of exports for the year ending in 1897, compared with the year ending in 1896, was principally in the exports of corn, wheat and cotton.

Technical Education.

Editor Textile World:

The mistake made by most men who sneer at, if they do not openly oppose, technical schools, is in thinking that their advocates urge them as substitutes for practical work. Their thought has not only no foundation in fact, but no men are more in favor of practical work than are the intelligent advocates of technical education. It is in the union of practice and theory that they look for the real solution of the industrial problems that confront us. As well give boys and girls books, ordering them to study grammar and mathematics without a teacher, believing that they would succeed, as to put boys and girls at machines, offering them no other aid than their own efforts or that of persons ignorant of the machine's intricate and complicated parts. Nothing so ennobles labor and takes from it its task-like features so much as a knowledge of the whys and wherefores of labor's results. It is not only very unjust, but it is very unwise and very ignorant, for anyone to talk about "mere theory" in connection with Germany's technical, industrial and industrial art schools. There is no more proof in the eating of a pudding than there is in measuring the value of any system by its results. How practical is the system of education adopted by this empire, especially by its most active, energetic and progressive parts, is proven by the success built up in any series of years since their adoption. Germany, just now, is under greater obligations to her technical, industrial, and industrial art teachers than to any other of all the active agents or energies of the empire. The schoolmaster is abroad and has been abroad. He has helped to build the nation as no one other factor or force has helped. No one who knows anything about education expects more of the schools than they are able and ought to be able to give. There is such a thing as theory combined with practice. It has had such success here that the two will never again be separated. Take weaving as an art and science, for it is both. The boys that go out of the Crefeld, Reutlingen, Aixla-Chapelle or Chemnitz schools can not only weave and weave well, but they can build up an industry from foundation stone to the ridge board of the roof. They learn all about weaving, from the crudest forms found in Assyrian or Egyptian hovels, to the complicated, intricate and marvellous combinations of Crompton or Jacquard. The system is so simple that it must commend itself to anyone wanting to aid the weaving industries of other sections. The classes get oral instruction, listen to lectures on the history of weaving, are taught to draw from designs, free hand and from nature. They go over the growth of the art from the simple loom of the savage to the present day. They are taught all that is known or all that is worth knowing about weaving. With this they go into the shops; for the schools here have splendidly equipped shops, where, under the eye of, and aided by men who have already made their marks in mills, and who have been selected to teach because of their superior skill, practical knowledge, etc., etc., they learn to run, regulate and fix the machines in such a way, let me say, as one learns in a mill only after years and years of practice. Another thing, there is no nonsense about these schools. The namby-pamby dilettanteism that devotes all or most to the artistic side of a technical education is tabooed. It is the practical side that the boys see and work on. While drawing is made much of, it is drawing in connection with the work in hand. Not a line is traced that has not for its ends perfection in the branch the boy is to follow; not a circle is traced that has not the same thing for its centre. The arrangements of the Empire's system of technical education tells more about the benefits of the system in its make-up than

a mile of writing would do; that is, if one understands the words used in naming the system. It begins with the industrial (Gewerbe), continues in the industrial art (Kunst Gewerbe), and ends with the technical school. In the industrial schools little ones learn how to work on looms, mules and machines, and in the industrial art the young men learn, not only how to do a thing, but why it is done. In the technical school all the scientific principles are gone over and given such attention that the boy who completes such a course is pretty nearly an expert when he leaves it. If teachers find extraordinary talents in the industrial schools they advance them to the industrial art schools. If here the talents are still pronounced, and they are backed by energies, intelligence and a desire to go forward, the student is assisted. Nothing is lost, neglected or wasted. There are thousands all over the empire watching for each spark of genius's divine fire. Even extraordinary talents are aided. I cannot call your attention, and that of your readers, too forcibly to the danger of beginning wrong or of degenerating after you have begun, into mere delettanteism. The efforts must be earnest. To dignify labor is, or should be, the honest desire of all who have anything to do with such schools. I fear sometimes that in artistic excellence, especially in floral decorations for patterns, etc., etc., energies will be wasted that might make for much, very much, if applied to the more practical and better paying parts. I would suggest the building of art schools, for such as want them. That is what is done here. Stuttgart, Dresden, Berlin, Munich, etc., etc., have such schools in most successful operation. They supplement, but never take the place of the industrial, industrial art, or technical, schools. Here I have under my eyes, daily, practical demonstrations of the worth of these schools. What is said about weaving is just as true about knitting and lace making. The almost phenomenal success of this city and section is due in a very large degree to the successful knitting schools now running for 25 years. The teacher that presides over the school in Chemnitz journeyed all over the world, even to the East, at the expense of the city, State and school. After examining England's, America's and Eastern systems, he settled down here to do what he has done or helped to do for those by whom and for whom he was employed. While I caution against efforts along lines that belong to art schools, and while I urge wise economy and the very best use of energies, I advise and urge the most liberal treatment of teachers and schools. The one should be paid well and aided in journeys to Paris, Lyons, Roubaix, Berlin, Milan, etc., and the other should be equipped with the best teaching apparatus on earth.

Yours very truly,

I. C. MONAGHAN,
U. S. Consul.

Chemnitz, Saxony.

Warren M. Orswell.

We gave a brief notice in our July number of the decease of Warren M. Orswell, of Fitchburg, Mass., who died July 5th, at the home of his daughter, Mrs. Elvira Gaylord, Pawtucket, R. I. Mr. Orswell had been in poor health for about a year preceding his death, and had been away from his mills for eight or nine months. He had broken down from overwork. He was born in Providence, R. I. His first experience in a cotton mill was at Blackstone, and when only 18 years of age, he became an overseer in the mills at Valley Falls, R. I. From there he went to the Wamsutta Mills, at New Bedford, as overseer, and later he was for seven years superintendent of the Albion Company's mills, at Albion, R. I. From Albion he went to Shirley, where he became superintendent of the Phœnix and Fredonia mills, and later started the Shirley Yarn Company. In May, 1886, he

went to Fitchburg as president of the Orswell Mills, and in 1888, the Lancaster Manufacturing Company was started, and he has been treasurer since the organization. The Nockege Mill was started in February, 1893, and Mr. Orswell was president from the organization to his death. Mr. Orswell was a practical manufacturer of first-class ability, and a gentleman of high character. The corporations of which he was active in the management, greatly promoted the growth and prosperity of the city in which they were located. He was of retiring nature, but had a circle of warm intimate friends. Mrs. Orswell died at Shirley about two years before Mr. Orswell came to Fitchburg. The deceased leaves one son, Edward W. Orswell, and one daughter Mrs. Elvira Gaylord, both of whom reside at Pawtucket, R. I. He also leaves one brother, Rufus G. Orswell, of this city, and one sister, who resides in Pawtucket.

Automatic Sprinklers.

The utility of automatic sprinklers in manufacturing establishments, as a protection against excessive loss from fire, has been recently exemplified in two recent instances, one at a woolen mill in Lowell, Mass., and another at a cotton mill in Warren, R. I. The former showed the negative value of sprinklers in the fact that had the sprinklers been operative with a supply of water, they would have prevented the large loss that occurred. In this case, it appears that the sprinklers failed to act because the water was shut off, a not uncommon experience found by mill inspectors, due to various causes, but generally to that of neglect. This fact has called forth from the insurance companies the suggestion that the main sprinkler valve be opened and sealed and examined daily by someone in executive control, and the examination be a matter of record at the office. The fire in the second instance, at Warren, R. I., occurred in a cotton storehouse, in which the sprinkler prevented a large loss that would probably have amounted to the neighborhood of $10,000, but which amounted to only $233. This is a striking example of the benefit from sprinkling a cotton storehouse, as well as the factory proper.

Indifferent attention has been given to this protection of storehouses, and insurance companies have taken many chances that should be removed. In connection with this, insurance companies recommend that sprinklers should be established, from which the water may be drawn off in winter and put on in other seasons, and that the storehouses of large area should be supplied by fire walls or fire-retardent partitions, so as to have no excessive amount of stock at risk from any one fire, and further, that it is very desirable that raw stock should be stored separately from finished goods.

Real India Shawls.

Since the introduction of the Thibet goat into France, the cashmere shawl has been imitated with such wonderful exactness that it is hard to detect the imitation from the original. Experts say, however, that the genuine India shawl can be detected from its having a less evenly woven web and also from its brighter colors. It is likewise said that the border of the real India cashmere shawl is invariably woven in small pieces, which are sewed together, and the whole border is afterward sewed on to the centre. It is a mistake to think that the shawls are manufactured in India in the form in which they are sold in Europe. Generally the borders and centres come out separately, and are put together in sizes and often in patterns to suit the customers. A number of shawls sold as "real India" are actually manufactured in France, says one of our foreign exchanges. Persons familiar with both articles say that the original is softer than the imitation, and that this softness arises from the way the yarn is

spun and partly, also, because the Thibet goat deteriorates when removed from its native hills. As laces woven by hand in damp cellars bring a price five times greater than those woven by machinery, so fashion prefers the ruder work of the Orientals, which costs vastly more than the cleverest imitations.

In Bokhara, where the finest and most expensive camel's hair shawls are manufactured, the camel is watched while the fine hair on the under part of his body is growing. This is clipped so carefully that not a fibre is lost, and it is put by until there is enough to spin into a yarn which is unequalled for softness. It is then dyed all manner of beautiful, bright colors, and woven in strips eight inches wide of shawl patterns of such exquisite design as with all our study of art and all our schools of design we are not able to rival. These strips are then sewed together so cunningly that it is impossible to detect where they are joined. Russia is the principal market to which these beautiful Bokharan creations are sent. From Russia they find their way all over the world, London, Paris, Vienna and New York being the heaviest importers. Besides these Oriental shawls there are beautiful woven shawls of Paisley, Scotland, the printed shawls of Lyons, and the filmy Llama lace creations, which, unlike the Oriental works of art, are within reach of the moderate purse. Special artists with pencil and brush are engaged in making designs for these shawls. While years and sometimes a lifetime were and are required for the manufacture of the Bokharan and Hindu shawls, at Paisley, if the pattern requires months in its designing, the weaving of the most elaborate pattern occupies only a week. The cutting of the threads from the backs of the shawls, which was formerly a process requiring the combined labor of two girls an entire day for each shawl, is now done by a French machine in a minute and a half. Few of the grand dames who boast of costly Oriental shawls, rugs and portieres, know that these same articles have probably seen service before they came into their possession; that the magnificent shawls in which they wrap themselves have enveloped the women of some harems, and the rugs and portieres have draped their luxurious apartments. It is not uncommon to find a telltale darn that confirms this suspicion.

Country Mills.

R. W. Eaton, president of the New England Cotton Manufacturers' Association, has many good, practical ideas about things, and among them may be mentioned those relating to advantages of country mills.

There are advantages and disadvantages of country mills, he says, compared with those located in manufacturing centres. The principal reason for the location of most of the country mills was availability of water power. In many places this still is an advantage. It is often claimed now that the cheapness of transportation and the high efficiency of engines render this item of little consequence, that a mill located at a convenient seaport can obtain its power so cheaply that it is not worth while to go to a conntry place and expend large sums for a water power plant. If this water power be unreliable, or if it be insufficient for a part of the year, thereby compelling the installation of a steam plant as an auxiliary, this argument may hold. But a mill with a reliable water power plant unquestionably has an advantage over a mill run by steam power. Distance from the centres of supply and from large repair shops has been detrimental to country mills in the past; but with the rapid increase of transportation, telegraphic and telephonic facilities, this disadvantage of distance has of late years decreased. The same forces have also improved the condition of country mills in the delivery of goods to market. In fact, many coun-

try mills have been made, by these improvements, almost as accessible as those in the large centres.

One great objection to country mills may be found in the isolation of the plant as it affects the management and the operatives. A visitor to a country mill which has been a long time in operation, finds a community of workers living near the mill—many of the families residing in houses belonging to the company. To these families belong the operatives needed for the important parts of the mill work, and in the same families are found the persons that must be hired for the less important parts. Families often stay in these villages for years, the members as they grow up being taken into the work and life of the mill. The brighter boys are advanced to more and more important places, and we find in some country mills men who have never worked or rarely ever been in any other. This is very pleasant. There comes to be a certain comradeship through the whole mill. The overseers are still called by their first names, even by the littlest fellows in the rooms. All moves along pleasantly; the life inside the mill is but a continuation of that outside. But there is another side to it. A community such as this, with which many are familiar, may lack one element to make it successful. It may lack the energy due to competition; such a community is liable to get into ruts. A mill located near other mills and where the excellent work in one is heard about in another, receives thereby a stimulus to activity. A country mill is liable to get into ruts, to cling to old methods. There is nothing worse in a mill than this. A self-satisfied feeling, an idea that "we are getting along first rate" is the beginning of a mill's downfall.

In large manufacturing centres, improvements are in the very atmosphere. Inventions and modifications are brought promptly to these mills, while the managers of country mills oftentimes have to hunt for them. To the question, then, whether country mills can hold their own or not, lies in the ability of the manager to overcome the inertia in the operatives, due to lack of contact with other operatives. It is evident at the start that the manager himself must keep in touch with the latest thoughts.

Action of Oxides on Cotton Cloth.

At one of the meetings of the Chemical Club, Manchester, England, in May last, an interesting discussion took place on the tendering action of copper and other oxides on cotton cloth in the process of bleaching with chloride of lime. The principal speaker on this occasion was W. Thomson, who referred to an investigation of his for the purpose of discovering the cause of damages to cotton cloth due to the existence of oxide of chromium left in the fabric, and the action thereon of certain chemicals. Mr. Thomson relates that he found the cloth in holes at different places and tender at spots here and there, and this damage, he was informed, had taken place during the process of bleaching. He found that wherever there was a hole or a tender place in the fabric, there were traces of copper. He therefore made experiments by putting some oxide of copper on the cloth which was then bleached. He found on passing it through the bleaching process that the chloride of lime rotted the cloth wherever there was a considerable quantity of copper oxide on the fabric. He had that day taken a piece of cloth and put on different quantities of oxide of copper at different parts of the piece, and bleached it with chloride of lime, and if it were held up to the light they could see the parts at which the stuff had been put on. On drying it with a hot iron, it had produced a little scorching on the parts which contained the strongest solutions of copper, and he thought that must be due to the fact that oxycellulose was more readily scorched by a hot iron than the ordi-

nary cloth, because no scorching had taken place on the parts which contained no copper oxide. He passed a part of the cloth treated with different quantities of the copper oxide and bleached through a solution of methylene blue, and on being held up to the light it would be seen that the parts which had the oxide of copper on were deeper in color than those which had not been so treated. That would show that the cloth treated with copper oxide had become converted into oxycellulose. He had made some further experiments with some other oxides, and found that cobalt oxide had a still greater effect, and nickel oxide about the same as copper oxide, but manganese oxide under similar conditions had little or no effect in converting cotton into oxycellulose or in tendering of the fabric.

Mr. Thomson was asked whether there was any ammonia present in any way in the fabric, to which he replied that there was no ammonia present. He simply put in one case the solution of copper on the cloth, passed it through carbonate of soda, and then bleached it in the ordinary way. In the other case he took chloride of copper (a neutral solution), and passed the cloth stained with it straight into the chloride of lime solution, which produced tendering of the fibre where the copper had touched.

Dr. Knecht said he thought the subject as presented by Mr. Thomson had brought before the society a distinct advance in their knowledge of faults in bleaching, and that the observations which he had made might in frequent cases tend to explain faults which had hitherto been inexplicable. Copper, as is well known, might get into piece goods in different ways. Of course it was not present in the cotton itself originally. It might get in in the process of spinning, or more probably in the weaving machinery, and become dissolved in the piece, either before or during the process of bleaching. That might easily account for the tender spots which it would have been impossible otherwise to explain. Mr. Thomson offered no explanation as to why the cotton should be tendered, and he asked whether any could be suggested, or whether he thought that the tendering action was due to the formation of the cupric acid discovered by Krüss; to which he said that he had not studied what action had taken place. Possibly, these higher oxides had been produced, and caused the rotting of the cloth; one knows, however, that copper under other conditions had most curious oxidizing actions upon certain things. For instance, in the case of india rubber, the merest trace of copper therein would bring about its oxidation and decay within a comparatively short time. Copper wire caused the gutta percha which was put round it for the purpose of insulation to oxidize and become hard and brittle, and the wire was now covered with tin, previous to covering with gutta percha, so that it would be a rather difficult problem to decide whether this oxidizing action was owing to the formation of a highly oxidized compound, which might afterwards act upon the india rubber or the cloth, or whether it was due to something of the nature of "catalysis," which meant something they did not know anything about.

In the discussion of this subject, it was remarked by someone that he had taken a hank of yarn, boiled it in a solution of copper sulphate, and then passed it through a weak solution of caustic soda, and dried it in a stove. A certain amount of copper oxide was deposited. He bleached it and tested the breaking strain, but found very little difference. He bleached with chloride of lime.

Drying and Carbonizing.

Editor Textile World:

In looking over some of the back numbers of the TEXTILE WORLD, I hap-

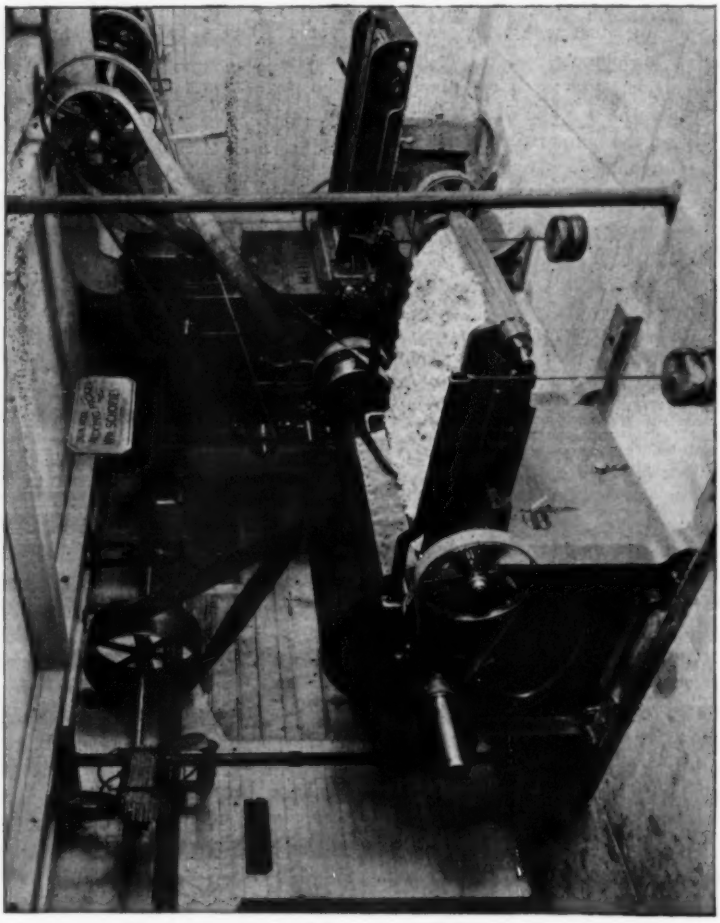
pen to alight on an article on "Carbonizing," by W. W. J., in the April number for 1895. He ends up with the following: "The ideal method of drying, in the carbonizing process which has lately been realized, to my mind, is a method which brings a great volume of hot air in contact with the wet wool, which, in this condition, is best able to resist any injurious action, and in proportion as the wool dries, the air brought in contact with it is gradually reduced in temperature, in proportion as the drying process takes place, so that when the wool is almost dry, or wholly so, the temperature of the air is very mild indeed. To my mind, only such an apparatus as this, wherein the drying facilities are regulated in such a manner, is to be commended, and indeed this applies not only to carbonizing wool, but to any drying apparatus, after washing or scouring."

Since then I have received a circular from the Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia, in which is described a form of drying machine which is built on the identical principles recommended by W. W. J. Another circular describes a carbonizing machine, embodying the same principles in the drying process. It is possible W. W. J. had in mind this machine when he wrote, but if not, if you would inform me of his whereabouts, I should be pleased to forward these circulars to him, as I feel confident he would experience some satisfaction in seeing his ideas carried out by people so well versed in the subject of drying as the concern mentioned above. W. D. P.

Philadelphia Textile School.

To the readers of the TEXTILE WORLD the history of the Philadelphia Textile School is not a new story. They are familiar with the causes which brought about its formation fourteen years ago, and its foremost promoter and sustainer, Theodore C. Search, president of the National Association of Manufacturers, has won the lasting gratitude of thousands who have been benefited, or who realize the benefits which the school has and will continue to bestow on others. For quite a length of time its existence was regarded by many as a more than doubtful experiment, one which might be all right in Europe, but not practical in America. In spite of much such adverse criticism, in the face of many obstacles, and at first with scanty support, the gentlemen having the undertaking in hand labored on, gaining a little here, a little there, making and endeavoring to retain friends in all the related lines of business. When the early graduates, by their success in positions which they obtained, began to prove the practicability of such training among us, renewed encouragement was forthcoming. Additional machinery and appliances were obtained, its scope was enlarged, and quarters were secured to meet the requirements of its growth. From then on its life has been most encouraging. The present high position which it holds in the educational world is a most enviable one, in that it is surpassed by no similar institution. Its students come from all parts of the union, north, east, south and west, each being well represented by bright, intelligent young men from the mills, commission houses, dye houses, schools and colleges. Canada has been sending some of her sons, and even old England is represented. The policy of the TEXTILE WORLD has ever been one of encouragement in the school's work, having recognized from the start the immense advantages which must surely ensue from the imparting of such technical instruction. That the Philadelphia Textile School is a success is admitted by all, and we firmly believe that its success brought about by an enormous amount of labor, has made possible the existence of many other schools for similar education of a more elementary character. While the years

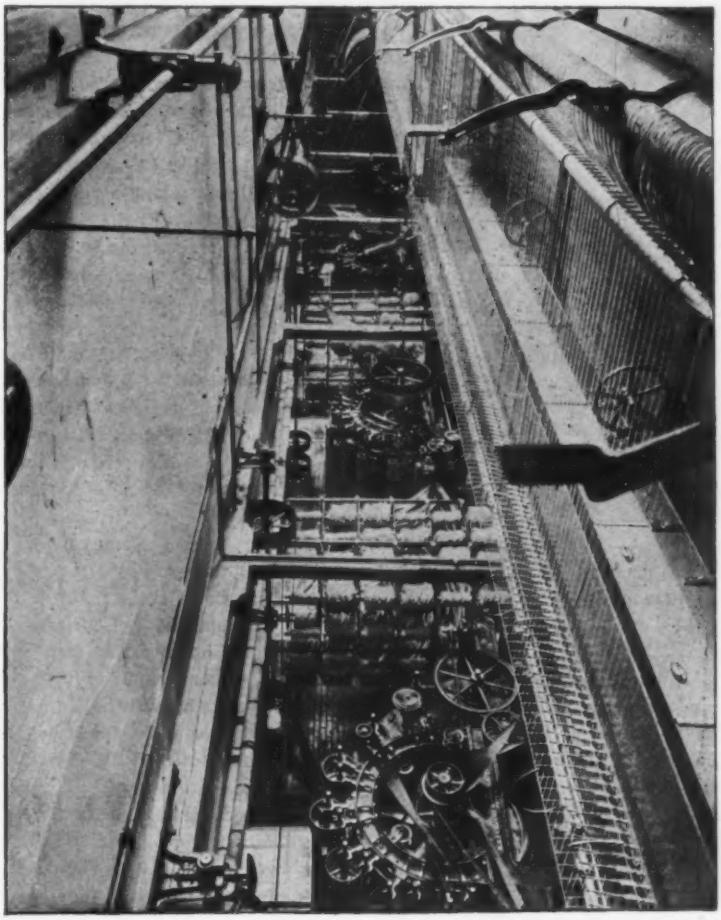
of up-hill work through which the school has passed have been almost discouraging at times, involving endless labor without regard to time or season, these years have undoubtedly been of untold advantage to its management in encountering and overcoming difficulties of many characters. The value of the experience thus gained can hardly be estimated, but that it is exceedingly beneficial is evidenced by the manner in which the affairs of the school are conducted. Those having charge of it are constantly besieged with requests for special and particular courses of study, which, in many cases, if complied with, would prove most disastrous to the student. In interviewing the numerous seekers after information with reference to the school, Director E. W. France is ever attentive, giving most careful thought to each particular case, advising each as to the proper course to pursue. In some instances what is recommended as wisest and best is not in harmony with the views of the prospective student, and rather than guide him in a wrong channel he is kindly told that the school cannot do as he desires.



CORNER IN WOOL PICKER ROOM.

Courses of study in woolens, in cottons and in silks, and a regular course, embodying all three, are now offered, having been arranged to give the most advantageous lines of studies in the

briefest time. While the regular course calls for three years, and the others for but two, the attendance for the full course is not compulsory, each student having the privilege of entering for one, two or three years, as he may see fit. The regular course is the one recommended most strongly to all, conveying, as it does, a knowledge of all fibres and fabrics, without restriction. The graduates having taken this course demonstrate by their general adaptability that it is the best, fitting them not only to turn to any particular line, on graduation, but also when engaged on any special class of goods they are enabled to embody the successful features of an entirely different fabric into their own. In other words, their knowledge is broad. Specialization is a good thing, but in the majority of cases it is best attained in the mill after the school has supplied the general knowledge. One of the most valuable branches taught, and one to which great importance is attached, is that of color harmony. Through its medium the eye is trained to keen perception of color in harmony and discord. The different effects of contrast and analogy in the harmonious combination of shade and tone are unconsciously impressed on the senses, while at the same time the principles governing these combinations are



WOOL CARDING AND SPINNING ROOM.

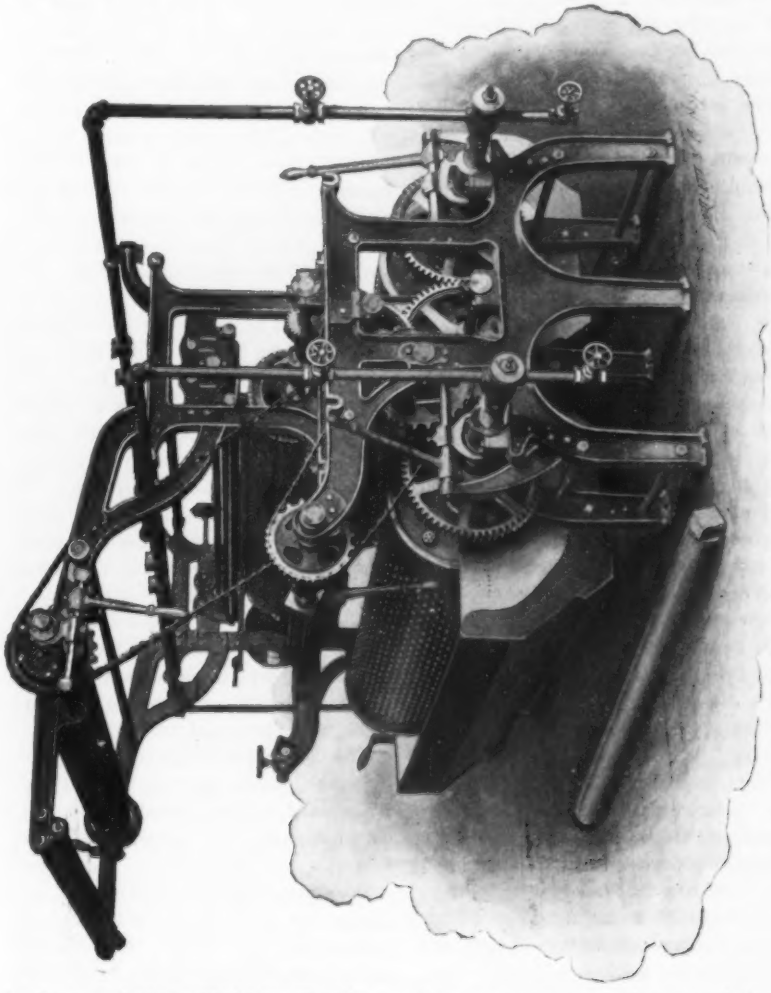
studied and commented on. The utility of this color study can only be measured by the amount of work the student is likely to perform in after life, for we well know that in all but few cases the coloring is what first attracts the buyer's attention.

A more comprehensive or unique equipment is not to be found. It embraces the necessary machinery for producing finished yarns and goods from either the raw wool, cotton, or the cocoon of the silkworm. Upwards of one hundred looms for various purposes are disposed throughout the different classrooms, some for silk, some for cotton, and others for wool. They represent a broad field of ideas in weaving mechanism, and provide an opportunity for study and comparison of utmost value. The departments of chemistry and dyeing have been in successful operation over ten years. Equipped with all necessary apparatus, they have been doing work of the highest grade. Not only in this, but in all departments, the school has been carrying on extensive experimental work of a technical nature. Its faculty is frequently in demand for expert testimony in law suits. From all parts of the country come inquiries for information and assistance on an endless variety of subjects. Manufacturers are ever writing for designers, assistant superintendents, dyers and salesmen. While the school does not care to pose as an employment bureau, still it is a remarkable fact that as many as fifteen of last year's students have been placed in lucrative positions through the good offices of the school. Too frequently the pupil who has attended the school but one or two years, and to whom an additional year would be of great benefit, cannot resist the temptation of the offer of a position which at the time seems all that could be desired, whereas if he were to complete his course and thereby obtain all that the school offers, he would be far better equipped and capable of performing work of a much more important nature.

The hustle and rush attending manufacturing in our country, up to the present, has almost excluded the idea of artistic results. The aim has been to turn out quantity, and in so doing make corresponding gains in fortune in a short space of time. Yards and not quality of finish and design has been almost the entire end in view. Of late, however, it has become more and more apparent that something else is needed if our goods are to be sold against the exquisite productions of the countries over the sea. The grace and skill displayed in the design and coloring of the foreign fabrics, has proven that the school which does the most toward elevating the standard of home manufactures must possess the facilities for imparting training in the so-called fine arts. In this particular, the Philadelphia School is especially fortunate. Its art department has a reputation second to none, the distinctive features in its scheme of studies being art in which is embodied industrial features. The technical courses of study offered by the Textile School administered in such an atmosphere of art, cannot but impart to the pupils a delicate sense of beauty and fitness lacking in many of our designers in the trade.

We have recently learned that the increase in the classes of former years is to be far surpassed in the coming season. Constant inquiries are being received, quite a number having already registered for the various classes. The last term demonstrated that the already extensive laboratories were not capable of accommodating the demand. Accordingly additional space and apparatus is being arranged to the end that an increase of fifty per cent. in the classes is provided for. The institution's facilities are being further augmented by a new electric stereopticon. The system of electric lighting is being considerably extended, being so arranged that during lectures illustrated by means of the electric lantern, the lights in the auditorium can be readily controlled at the will of the speaker.

The school circular for 1897-98 contains detailed information of interest to all who are investigating the possibilities of such education. A card addressed to the Director will receive prompt attention, but only by a visit of inspection can one realize the full scope of this institution.



IMPROVED STEAM FINISHING MACHINE.

An Improved Steam Finishing Machine.

The cut, herewith shown, is the latest improved steam finishing machine built by the Parks & Woolson Machine Company, of Springfield, Vermont. It has been fully equipped with friction clutches, so that the cylinders, the loading drum, or the rolling attachment may be started or stopped while the machine is running, without any liability to shock or breakage. This also makes the machine much smoother and easier to operate. The cylinders are mounted on extra heavy weldless tubes running through from end to end, so there can never any leakage result from badly welded pipe. Each cylinder has two internal supporting heads besides those at each end. There is, moreover, a vacuum valve in each end of every cylinder, or four in all. This construction absolutely prevents a collapse from the sudden formation of a vacuum, to

which all steam finishing machines are peculiarly subject. The vacuum is caused by too quickly turning on the water for cooling after the cloth has been steamed. The regular length of the cylinders has been increased to 74", giving more margin for the different widths of goods and more room for tying in the ends.

Many other minor details have been improved, so that every part is thoroughly up to date.

The manufacturers of this machine have just issued an eight-page pamphlet on steam finishing, which they will be pleased to send to any address, postage free.

—We are in receipt of the 1897 prospectus of "The Working Men's College," Melbourne, Australia. It appears that this college is founded to improve the education of those who work, and especially to facilitate the attainment of a knowledge of handicrafts, arts, sciences and languages, by the establishment of classes, workshops, laboratories, reading rooms, libraries, museums, and by such other means as may be devised. The college has several departments. Among them may be mentioned the following: Literary and Commercial-Bookkeeping, Elocution, French, German, Latin, and Writing; Music—Singing, Violin, etc.; Mathematics—Arithmetic, Algebra, Geometry, Trigonometry; Engineering—Geometry, Applied Mechanics, Drawing, Electrical, etc.; Architecture; Household Economy—Cookery, Needle Work, Dress-making; Art and Applied Art; Science; Trade—Boot-making, Carpentry, Plumbing, etc.; Agriculture and Rural Industries—Veterinary Science, Wool Sorting.

—When foaming occurs in a boiler, checking the outflow of steam will usually stop it. If caused by dirty water, blowing down and pumping up will generally cure it. In case of violent foaming, check the draft and fires.

Cotton Trade of Great Britain.

PROGRESS MADE DURING THE REIGN OF QUEEN VICTORIA.

There is no more striking chapter in the history of the eventful reign of her gracious Majesty than that which has for its theme the extraordinary growth and development of the staple trade of Lancashire. In the year in which her Majesty ascended the throne, the consumption of cotton in Great Britain was only about 13,000 bales of 500 pounds per week. This year it is at the rate of 63,000 bales per week. In 1836 the export of piece goods was 637,000,000 yards; in 1837 it was only 531,000,000; but last year it reached 5,220,000,000 yards! There is not a country on the face of the earth into which the celebrated shirtings and other cotton fabrics of Lancashire do not find their way. They form a large portion of the clothing of the thousand millions of people who dwell in Asia, Africa, Australasia and America, and, in larger or smaller quantities, they successfully scale the walls of protection put up by those countries of the Old World and New, who vainly seek to monopolize the making of their own clothing materials.

The rapid growth of the industry is shown in the following statement of the number of spindles and looms, and the number of hands employed in the years 1836, 1856, 1876 and 1896:

The figures for 1836 are based upon the investigations made by Mr. Edward Baines and Dr. Ure sixty years ago. The estimate of the number of hand looms is a very moderate one; some other authorities favoring 250,000. The figures for 1856 are from the factory returns published in 1857, but collected in 1856, by which time the hand loom had been superceded by the power loom, in consequence of the great improvements made in the latter, chiefly in the early 40's, at which period there was for a time a good deal of distress in the manufacturing districts, occasioned by the large number of hand

loom weavers temporarily thrown out of employment. The figures for 1876 are the averages of the factory returns for 1874 and 1878. The Parliamentary return for 1885 gave the number of spindles as 44,348,000. The return for 1890 gave 44,504,000, but this latter statement was considered to be altogether too small, and the return itself very incomplete. Worrall's Directory gives the increase in spindles between 1885 and 1896 as about 2,000,000; and the round figure of 46,000,000 adopted for 1896 is probably smaller than the number actually at work. The number of looms is the current estimate. As the Parliamentary returns do not always discriminate between spinning spindles and doubling spindles, we have included both in the above statement.

	No. of spindles.	No. of looms.	Hands Employed. Spinning.	Weaving.	Total.
1836 . .	12,000,000	Power 110,000 / Hand 200,000	150,000	250,000	400,000
1856 . .	28,000,000	Power 300,000	187,000	192,000	379,000
1876 . .	42,000,000	" 490,000	259,000	222,000	481,000
1896 . .	46,000,000	" 650,000	240,000	300,000	540,000

It will be seen that in the first twenty years the spindles increased more rapidly than the looms. This was due mainly to the displacement of the hand loom by the power loom. In the last twenty years the ratio of the increase in looms has been greater than that in spindles, owing to the smaller relative increase in the demand for yarn for export. This feature is brought out more clearly in the following statement of the quantity of cotton spun, the quantity used in the production of the yarn exported, and the quantity remaining for yarn woven into piece goods, in 1000's of pounds:

	Weight of cotton spun. lbs.	Used for Yarn exported. lbs.	per cent.	Left for weaving, &c., lbs.	per cent.
1836 . . .	347,400	97,010	27.9	250,390	72.1
1856 . . .	891,400	199,644	22.4	691,756	77.6
1876 . . .	1,280,300	255,810	19.9	1,024,490	80.1
1896 . . .	1,644,650	271,700	16.5	1,372,950	83.5

The weight of the cotton used for yarn exported is the weight of the yarn shipped plus 10 per cent. for waste in spinning. It will be seen that of the total output of yarn the proportion exported has gradually fallen from nearly 28 per cent. to only 16 1-2 per cent. Of late years this branch of the trade has lost ground, not only relatively but positively. The quantity exported in 1884 was 271,078,000 pounds against 247,000,000 pounds last year. This is due to diminished shipments to the Continent, owing to the increased production of yarn in Germany and elsewhere.

The distribution of the piece goods and yarn exported is shown in the following statement in millions of yards and pounds:

Piece Goods.	*1836. Yds.*	*1856. Yds.*	*1876. Yds.*	*1896. Yds.*
White or plain	224.5	1,221.3	2,668.3	3,405.1
Printed or dyed	313.2	813.9	1,000.3	1,815.2
Total	637.7	2,035.2	3,668.6	5,220.3

The falling off in the export of piece goods to the Continent since 1876 is due to the increased production of similar goods on the Continent itself, and to increased import duties. The reduction in the exports to North and South America between 1856 and 1876 was due to the lessened exports to the United States caused by the protective tariffs levied after the war; the exports of goods to the States falling from 207,000,000 yards in 1856 and 227,000,000 in 1860 to 103,000,000 in 1870 and 55,000,000 in 1876. In 1896 they were still at only 56,000,000. The expan-

sion in the trade in the East is due in part to the improvements in the loom in the early 40's, already referred to, and to the opening of the China ports. The increased trade with the world in general is the outcome of the reduced cost of production due to improved machinery.

	Cotton Spun.			Cotton Manufactured.		
	Pounds (1,000's).	Hands Employed.	Lbs. per hand.	Pounds (1,000's)	Hands Employed.	Lbs. per hand.
1836 . .	347,400	150,000	2,315	250,390	250,000	1,000
1856 . .	891,400	187,000	4,766	691,750	192,000	3,602
1876 . .	1,280,300	259,000	4,943	1,024,500	222,000	4,614
1896 . .	1,644,650	240,000	6,852	1,372,900	300,000	4,576

The values of the goods and yarn exported in 1000's of £'s and pence per yard and pound compare as follows:

Value of Piece Goods Exported.

	Total. £.	Per Yard. d.
1836	17,183	6.47
1856	28,521	3.36
1876	49,943	3.28
1896	51,224	2.35

Value of Yarn, Hosiery, Lace, Etc.

	Yarn.		Hosiery, Lace, etc.	Total. All kinds.
	£	Pr. lb. d.	£	£
1836	6,120	16.66	1,329	24,632
1856	8,029	10.61	1,682	38,232
1876	12,782	13.21	4,908	67,633
1896	10,048	9.78	8,109	69,381

The percentage of the decline in the value of yarn is less than that of the fall in the value of piece goods, partly because of the great cheapening which took place in the cost of weaving between 1836 and 1856, and partly because of the large increase in the cheaper makes of goods sent to the East. The smaller percentage of decline in the value of yarn is also due in part to the increased proportion of the higher counts of yarn exported. Between 1856 and 1876 the diminished export of the coarser and cheaper, and the increased export of finer and dearer counts of yarn, more than counteracted the influence of the general tendency towards lower prices.

The diminished cost of production is, of course, the result of the great saving of labor affected by improved machinery, especially in the power loom, during the ten or twelve years after 1836. The extent to which these improvements have made labor more productive is shown in the following statement of the weight of cotton spun, the weight manufactured, and the production per hand employed:

At the 1836 rate of production per head, the 1,644,650,000 pounds of cotton spun in 1896 would have required 700,000 operatives, instead of only 240,000; while the 1,372,900,000 pounds manufactured in 1896 would have required 1,372,000 hands, instead of 300,000. For both departments the number of operatives required in 1896 would have been 2,082,000, instead of only 540,000. But this is not all. The hours worked in 1836 averaged 69 per week, against 56 per week at the present time, which means that with the machinery of 1836 and the hours of labor of 1896, over 2,500,000 operatives would have been required to manipulate the cotton spun and manufactured in 1896, so that the saving effected by the "ingenuity of man" represents the wages of 2,000,000 operatives. Of course, if this saving had not been effected, the industry would not have progressed in leaps and bounds.

But the improvements in machinery and in mill building have not only cheapened the cost of a world-wide used article of clothing, they have also vastly improved the position of the work-people, whose wages are from 50 to 100 per cent. higher than they were in 1836, while the chief articles of food are much cheaper now than they were then. Moreover, the work-people are better housed, better clothed and better educated than they were sixty years

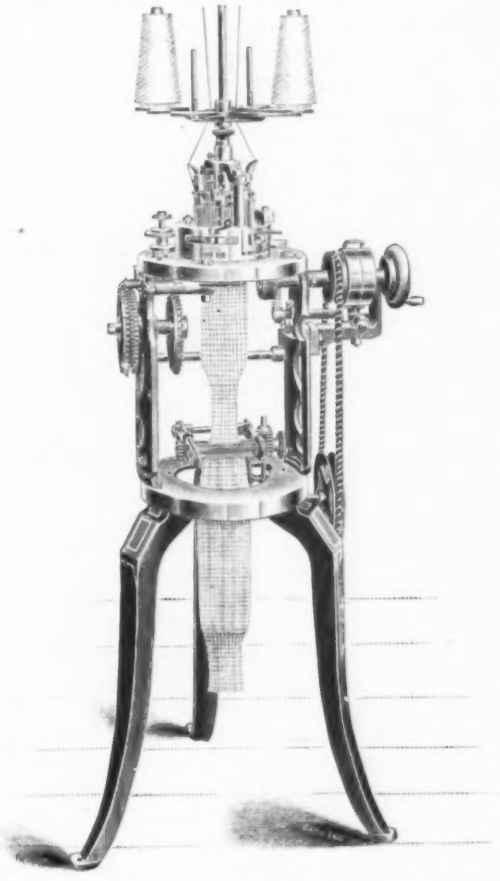
ago. They have also more time for leisure and self-improvement, more holidays and more money to spend on them. The conditions under which they follow their employment are also vastly improved; the mills and sheds in which they work being larger, pleasanter and healthier than those of even a generation since, to say nothing of those of two generations ago.—[Ellison & Co.'s July Report.

—Take care that no water comes in contact with the exterior of the boiler from any cause, as it tends to corrode and weaken the boiler. Beware of all dampness in seating or coverings.

Chainless Measuring Device.

FOR RIB KNITTING MACHINERY.

We show, herewith, a chainless measuring device for rib knitting machinery, which has recently been perfected by the McMichael & Wildman Mfg. Co., of Norristown, Pa. It is very much appreciated by manufacturers who are using it. The approximate length of the pattern is determined by stationary plates or segments on the measuring disc, held in place by screws, each plate representing three inches of fabric. There is also an adjustable plate, the movement of which gives from the smallest fracture of an inch to three inches. This adjustable plate is held in position by one binding screw, and by the use of a screw driver a change of three inches, of any part thereof, can be made in a few seconds. The movement of the measuring disc is controlled by a card wheel, which is conceded to be a most excellent mode of measuring fabrics.



CHAINLESS MEASURING ATTACHMENT.

This mechanism is enclosed by a moveable cover, which holds an indicator that enables the operator to start a new pattern, without the necessity of hunting for the starting point.

The card wheel is covered by a guard which protects the points from becoming bent or broken, and also protects the hands of the operator when setting up the work on the machine.

This mechanism allows the machine to be run at a high rate of speed.

Cotton Spinning in Germany.

A report to the Moniteur Officiel du Commerce, Paris, says: The growth of the cotton spinning industry, which was noted two years ago in Germany, has increased recently in a remarkable manner, owing to the favorable conditions which were presented during the year 1896. For a time the factories were unable to supply the demand; at the beginning of August, the spinners had already sold, in advance, their entire production for the year. Profiting by the rise in cotton, they advanced the price of thread 10 per cent., and, strange to say, the latter was not subject to the depression of 20 per cent. which the price of raw materials has since undergone. New factories were built, additions made to the old ones, capital invested, and the industry showed signs of surprising development in various parts of the Empire—in Saxony, in Westphalia, in Silesia, in South Germany, in Alsace, and in the district of Mulhausen, in Thuringia, where more than 20,000 hand weavers were employed, and where, until now, there was not a single mill. It is thought, however, that the limit of consumption has been reached, and if the production continues at its present rate, the market will be overstocked and a crisis ensue. The situation in Austria and Italy is held up as a warning to German manufacturers. Another important industry which is threatened with serious difficulties is that of jute.

Among the Dry Goods Trade of New York.

Geo. Fabyan and Edwin H. Baker have been admitted to the firm of Bliss, Fabyan & Co.

Thos. B. Langford has started, at 56 Worth Street, as a general cotton goods broker.

The Farr Alpaca Co. has moved its local salesroom to 22 Thomas St.

Bossert, Pere & Fils have captured John R. Fraser, one of W. H. Fletcher & Co.'s salesmen.

The Oregon City Woolen Co. is to add clay worsteds and serges to its spring fabrics.

The improved demand for mohair goods in the West, is said to be due to call for bicycle skirts.

The Collinsville (Mass.) Woolen Mill Co. will, hereafter, have its product handled by Sawyer, Blake & Bramhall.

J. H. Allen, a knit goods chief, has transferred his allegiance to Dudley, Battelle & Hurd, from the Beach Mfg. Co.

H. E. Fisher, agent of the Atlanta (Ga.) Cotton Mills, was a late visitor.

V. C. Miller, of cotton goods department, note, has shifted to Wheelwright, Eldredge & Co., from Carey, Bayne & Smith.

Sigourney Lefferts, Mark R. Wendell, Jr., and Louis Praeger, have been admitted to the firm of Wendell, Fay & Co.

E. B. Hall, of Worth St., has been appointed selling agent for the Racine (Wis.) Woolen Mills.

A. Strauss, long with C. A. Auffmordt & Co.'s foreign hosiery department, is going into business for himself. Franz Horning, who has been his assistant, will be his successor.

Lord & Taylor are to increase their show room space for wholesale dress goods.

Louis Budell, who represents F. Vietor & Achelis, in Lyons, is in town.

James Talcott will be selling agent for the new West Eaton, N. Y., concern, that makes women's dress goods.

A delegation from the Southern Cotton Spinners' Association visited this market the other day.

Tefft, Weller & Co. have secured the second floor of the Central Syndicate Building, for their offices.

Edmund C. Fisher, known to the dress goods trade, died recently at his home in Brooklyn, of paralysis of the heart. He has been with Clapp & Kent, Messenger, Moore & Co., Messenger, Fisher & Co. He was with E.

S. Jaffray & Co. until that firm failed. Of late he had been with Walter L. Wellington. He leaves a widow and three children.

Back from Europe. D. W. Cook and W. H. Corbin, of Dunham; Dudley Hall, A. W. Watson, H. E. Cox, Buckley & Co.; A. K. Wright and J. H. Meyer, of Passavant & Co.; E. Molson, of H. H. Schwietering & Co.; M. Schramm, of Schefer, Schramm & Vogel; Otto T. Schuller and R. Kritchmann, of Walter H. Graef & Co.; F. Hoeninghaus, of Hoeninghaus & Curtiss; G. C. Andreae, of Wm. Schroeder & Co.; H. W. Thayer and Alfred Watkins, of H. B. Claflin & Co.; Albert Clayburgh, of Albert D. Smith; Emil Stern, of Stern & Stern; H. B. Schaen, of Abegg & Rusch; J. D. Weir, of J. D. Weir & Co.; William Reiss, the button importer; H. A. Lindgens, of Hardt & Lindgens; John B. Cozzens, of Cozzens, Elbers & Prankard; P. Voss, of Voss & Stein; E. B. King, of King & Beal; Otto Seyd, dress goods importer; J. Bussat, of Kahn & Kahn; S. Schiff, of Schiff & Bodenheimer; G. C. Blendow, of Wendt, Steinhauser & Co.

Recent departures for Europe. C. Vietor, of F. Vietor & Achelis; Thos. H. Macklin, hosiery importer; Henry Pahnn, of Schefer, Schramm & Vogels' foreign underwear department; Maurice Wertheimer, of Wertheimer & Co.; E. T. Mason, of E. T. Mason & Co.; Max Doermer, of Hardt & Lindgens; M. Bodenheimer, of Schiff & Bodenheimer.

The Gilbert Mfg. Co., which assigned, has been reorganized and will continue at 380 Broadway. The capital has been largely increased, and the number of directors changed from five to seven.

Calls for plain faced fabrics predominate in the advance orders for fall dress goods.

Among the recent visitors in town were: R. F. Learned, president Natchez (Miss.) Cotton Mfg. Co.; Arthur H. Lowe, president Parkhill Mfg. Co., Fitchburg; J. H. Montgomery, president Camden (Me.) Woolen Mills; W. G. Alden, president Mount Batty Mfg. Co., Camden, Me.; Elmer E. Page, agent, and H. S. Hall, superintendent, York Mfg. Co., Saco, Me.

A well-known observer of the dry goods market says anent the statement of the H. B. Claflin Co., for the first half of 1897: "It has hardly conveyed more to the market than it was expecting, there being a general impression that the interest and dividend charges would make a further drain upon the surplus."

The Wool Exchange will be open by the time this is in print, and auction sales will be begun in August. These are planned to be much like the London sales. Warehousing, classifiying and advancing are among the features of the exchange.

John Holmes, a well-known salesman for the H. B. Claflin Co., died recently, of apoplexy. He began for himself in Clinton, N. Y. In 1864, he joined the Claflin staff. He was a member of the wool club. He leaves a widow, three daughters and two sons.

Nathan Hobart, of Minot, Hooper & Co., of this city, is dead. He had also been with Almy, Patterson & Co., and Almy & Hobart. He leaves a widow, four daughters and three sons.

It is said that Howard S. Jaffray and Mr. Haver, of the old firm of E. S. Jaffray & Co., will, in the fall, start a new dry goods jobbing firm from the ruins. Mr. Haver states, however, that this is not certain. The receivers of the old firm have recommended that the creditors accept $200,000 from the heirs as release from the receiver's claim on the real estate. If this is done, an additional 10 per cent., making 90 in all, will be paid by the receivers. It had been hoped that dollar for dollar would be received.

Wm. A. West, who for ten years has traveled for Lawrence & Co., through the South and West, in the interest of the Pacific Mills, has gone with F. Vietor & Achelis. He will travel through the West for the domestic department.

Indications point to plain fabrics as the mainstay of the season's business. Many are old weaves reproduced.

Agents find it difficult to get orders for low count American cotton yarns accepted by spinners, stocks have run so low.

Crash clothing has been unexpectedly popular during the hot spell, and created a demand for linen homespuns that caught importers napping. Prices in these lines are higher.

Buttons are in such demand that button jobbers are sure to have a good season.

The demand for fancies in dress goods is confined mostly to low grade domestic goods.

The matelasse weaves in new combinations promise to be as popular among fancy dress goods as they were last season.

Taffeta silks, in fancy designs, are more and more in request.

Brocade silks are also developing strong tendencies; so are satin duchess silks.

Plaids are prominent in fall collections of dress goods. They are as bright as last year's designs, but not as gaudy.

In dress goods, the relative popularity of colors now runs like this: Red, blue, green, brown.

Wool and silk mixtures, and wool filled goods are, according to the silk importer's reports, securing a large part of the new season's business.

Wool Market.

The wool market remains one of continued strength. Although some of the sales have been speculative during the last month, the majority of them were consummated for consumption. A period has arrived when a realization of profits is in order. The conviction is strong that prices will continue to advance, due not only to the tariff on the foreign article, but to the advance in foreign markets. Large quantities of foreign wool are held in bond, waiting for a further rise in price. Staple wools are scarce for worsted yarns, and delaine staple is practically impossible to secure. Quotations are not exactly reliable, but it may be safely stated that such wools as Ohio XX and above are unpurchasable at less than 25 cents, which means 54 to 56 cents clean. Where Ohio delaine staple can be obtained, it demands 27 cents. Territory wools are particularly strong. Most attention has been given to the recent foreign importations, and large quantities of Australian wool have gone into the hands of consumers. The prospects are that the importations that were not entered until the day the tariff went into effect will be obliged to pay the new rate of duty. There has been more or less wool come in since the tariff went into effect, which, of course, will have to bear the new rate. Those that came in on the day of the passage of the tariff will be in dispute, and the question of tariff will undoubtedly find its way into the courts. The wording of the tariff act that is in question is: "On and after the passage of this act," and not "On the day of the passage of this act." Here is a nice legal question for the courts to decide. This is referred to more extendedly in our editorial columns.

Prices of wool abroad remain firm, with advancing tendency. The English and continental trade are buying freely, and taking all desirable lines without the aid of an American demand. This refers more particularly to merino wool. Recent advices from Goldsbrough, Mort & Co., Ltd., Melbourne, Victoria, say that "the disposition of values is upward, the prospects of a diminished clip from the approaching shearing creating a general anticipation that an advance in values must ensue. At length the drought is broken, and general rains have fallen during the past ten days throughout the Eastern colonies; anxiety in this respect is relieved, and as the rain has been on the whole accompanied by mild weather, further mortality among the impoverished flocks will be lessened. No

reliable estimate can be formed of the total losses of stock, they can only be revealed at the shearing; but there is little doubt that they have been very severe, and that the yield of the ensuing clip must, in conjunction with the impoverished fleece of the survivors, show a material shortage."

Cotton Market.

We reported last month the current price for middling uplands at 7 7-8 cents. At present writing, we give the quotation at 8 cents per pound, in New York. The statistical position of cotton remains strong, but at the same time the demand is light, due to the curtailment of production by a number of the largest cotton mills in New England, and many of the small mills in the South. Under ordinary demands, there would be a great scarcity of the raw material. The prospective yield of the current crop is still speculative. There is a general feeling that the crop will be a large one, sufficient to supply all of the necessary demands for consumption. The attention of the trade has been, of late, directed more to the conditions prevailing in Texas than elsewhere, where many complaints have originated, due to the unfavorable weather conditions. The drought over the southern and central portions of the Southern States has done more or less injury; the plant having shed its leaves, forms and squares. On the whole, however, we are inclined to think that the crop is doing fairly well.

The condition of the goods market is not what one would like. Prices are low for the manufactured article, and this, taken in connection with the scarcity of cotton and the practical impossiblity of making desirable selections, has induced many mills to adopt the conservative course of shutting down.

Many of the small Southern cotton spinners have found it almost impossible to get a new dollar for an old one, which has resulted in causing many of them to shut down until the market gets into a better position. The following statement has been given out of the cost of spinning cotton yarns in the South, which shows on every number detailed a loss in selling at present prices:

Count.	Cost.	Selling price.	Loss.
8s 2-ply to 8s 3-ply	12.84c	12.50c	.34c
10s 2-ply to 10s 3-ply	13.32c	13.00c	.32c
12s 2 ply to 12s 3-ply	13.77c	13.00c	.77c
14s 2-ply to 14s 3-ply	14.20c	13.00c	1.20c
16s 2-ply to 16s 3-ply	14.62c	14.00c	.62c
18s 2 ply to 18s 3-ply	15.05c	14.00c	1.05c
20s	15.26c	14.50c	.76c

The above table is based on current price of cotton, where obtainable.

Under date of June 30, the Alexandria General Produce Association reports as follows concerning the condition of the cotton crop in Egypt:

"The temperature in June has been favorable. Most beneficial heat was experienced during the second half of the month. The cotton plants profited by this; they are both healthy and vigorous. Their development is normal Nevertheless in some districts a slight backwardness is reported. At the beginning of the month, worms in number appeared in many plantations. Happily the great heat helped the farmers in their efforts to combat them, and at the present moment they have diminished greatly; no appreciable damage up to the present. The reports from Upper-Egypt continue to be very good; the fields are in prosperous condition, and several days in advance of last year. On the other hand, in the Fayoum there would seem to be some backwardness, but at the same time the cotton plants are in a normal state. Both in Lower and Upper-Egypt, and in the Fayoum, the water supply has been sufficient, and irrigation has taken place regularly."

—If a boiler is not required for some time, empty it and dry it thoroughly. If this is impracticable, fill it quite full of water and put in a quantity of common washing soda. External parts exposed to dampness should receive a coating of linseed oil.

COTTON DEPARTMENT.

How to Become a Manager.

For the past three or four years it has been no easy task to manage a cotton mill and make both ends meet. Even those with a snug surplus have been forced to the utmost economy. Those mills that put their machinery in prime order, and are of the best and most improved design, a few years ago, are the ones that are getting what cream there is on the surface now. And it looks to me as though the cotton mills in New England, with short hours and high wages, are to be successful and hold their own with the Southern mills, with long hours and low wages.

The subject of mill management has recently been brought to my attention by two young men asking my advice as to the best method of obtaining a mill to manage. Both seemed to have about the same idea of the best road to success, and anxious to get over it as fast as possible, even at risk of being lost among the hedges by the way. These young men recently spent one and two years at a technical school, and wished to obtain a position as assistant to an agent or superintendent, thereby putting themselves into a position to attract the attention of treasurers and directors, and learn the work at the "office." My advice to each of these young men was to first seek the actual and practical knowledge of the cotton mill by at least two years' close study and hard labor. To go and hire out to the overseer of some good carding room, make themselves indispensable to the overseer as a spare hand, if they could. In that way they could learn to operate every machine in the carding room, and do the same in every other department. If not in the same mill, go to some other. Then obtain an overseer's position. If they had the right material in them, it would not be long before they would attract attention. I believe this to be the correct way to attain a position to manage a cotton mill, and be sure of holding it. A young man stands about as good a chance of being struck by lightning as he does of obtaining a superintendent's position, if he has had no experience in the mill, although he may have had a first-class technical training. True, once in a while, a young man gets a good position through some influential stockholder or friend, and holds on for a time; but we are likely to soon read in the personals that Mr. Blank has resigned as agent or superintendent, as the case may be, and is about to engage in the law business with his father, or the insurance business with a friend. We know that invariably old agents and superintendents, if they wish to make manufacturers of a son, put him into the picker room first and thence through other departments; and then, if he likes the business by actual contact, he is sent away to some technical school, and upon his return used as an all-round hand in the office; and after several years' training, maybe, he may make a good manager.

A manager cannot have any too good an education, even a college education, which is a very great help; but it is by no means essential. Manufacturing is as much a study in practice as any calling, and must be obtained by work and study combined.

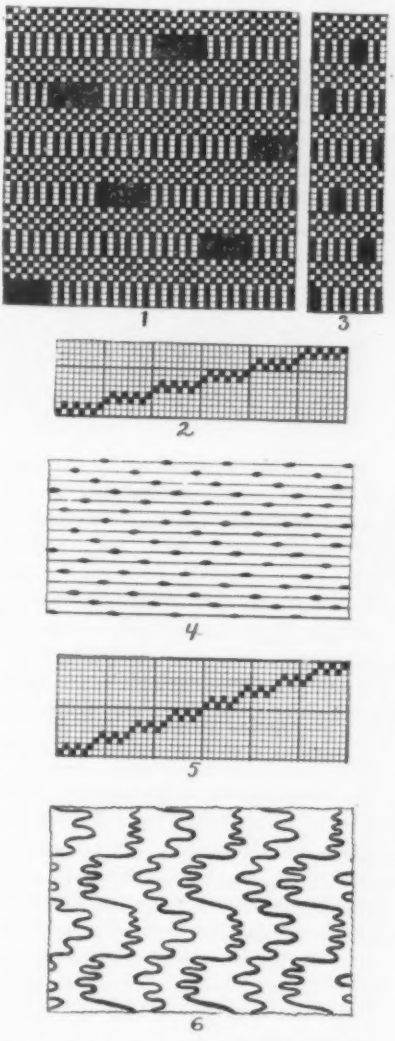
There is not a manager in position to-day that has obtained it through friendly influence, without practical qualification, whose company has not

paid dearly for the knowledge he has gained or is gaining. And even those who have been a long life-time in the business, and are suddenly given the management of a plant, make some costly errors; but they are few beside the man who does not know the needs and requirements of the working force inside the mill. M.

Practical Cotton Designs.

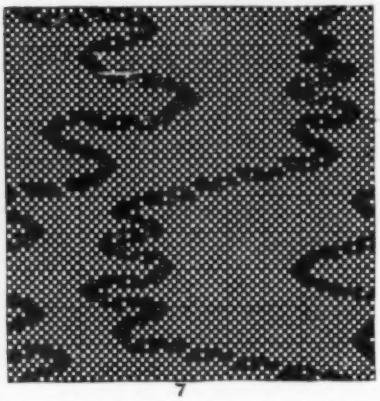
A very novel and effective design is given at Fig. 1, the effect in cloth being shown at Fig. 4. It is intended as a ground for heavy brocade figures, but would also prove effective if woven in the dobby; therefore the draft and pegging for same is given at Figs. 2 and 3. It will be noticed that the design is complete on 48 ends and 48 picks, the arrangement of the spots being in the order of 1, 5, 3, 6, 2, 4, which is an ordinary six end satin one, but any arrangement with a convenient number of ends may be resorted to, providing there is not too much ground between the spots, as this weakens the effect somewhat. It is by no means necessary to keep to the same proportion of ground as Fig. 1 in all brocade designs, as in instances where the figure is very delicate, the spots would appear to bury it, and therefore would have to be considerably reduced in number. For dobby weaving, each separate spot may be drafted on two shafts, thus allowing great variety of arrangement. If the style be introduced, a very good range of patterns could be produced suitable for heavy picked goods, as with drafting the spots might be made to group together and form themselves into set figures, or a simple draft, as at Fig. 5, might be tried, and a few patterns experimented with by letting the spots run in a zigzag manner up or across the piece as desired. By reversing the draft alternately, some very large effects on the diamond principle may be got. For pegging, a reference made to Fig. 3 will easily explain the principle of working the above suggestions.

The demand for cloths with lappet figures has led to the imitation of these effects in the Jacquard, and Fig. 6 shows a sketch for an imitation lappet



to be woven in a 400 Jacquard, and is complete on 80 ends and 80 picks, as will be seen by referring to the design at Fig. 7. There is no doubt that there is ample scope for the designer, of introducing effects of this description in a great many classes of design, and the

result, if worked out as example, is certain to give satisfaction; but we must understand in the first instance that it will require a closer reed and picked fabric for the imitation than for the real lappet, as the weft figure would not show up very plainly if made in a loose cloth. A good effect would



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be got by using 80 ends per inch of 40's warp and 80 picks per inch of 42's weft, although a still lighter quality might be made with good results. Effects of the above description would also come up well on a satin or fancy ground where the weft did not predominate.

MEDALIST.

(To be continued.)

Cotton Carding.—XI.

The other movement on a slubber is the bobbin or winding motion; this is the most intricate and complicated piece of mechanism on a speeder. The roving is delivered from the front roller, for 70 hank, at the rate of about 252 inches per minute to each spindle; now the bobbin must be so geared to wind on 252 inches per minute from the time the frame starts with the empty bobbin until the bobbin is full. To do this, the bobbin must revolve at a regular and uniform speed, until it has wound on the first when the traverse is reversed, and begins to wind on another layer, when it will at once dissemble to all that with one layer of roving on; the diameter of the bobbin has increased, and to wind on another layer without stretching the roving, the speed of the bobbin must be decreased.

This was a problem which confronted and baffled Arkwright, until Holdsworth invented the differential motion, the principle of which is accepted and used by all makers of speeders to-day. The winding begins at the maximum speed and is reduced to the minimum at the winding on of the last layer when the bobbin is filled. The bobbin gets its primary motion from a bevel gear with 40 teeth in the compound gear, this bevel gear being fastened to the main shaft by set screws, thus running the same number of revolutions as the main shaft. This bevel gear also drives another bevel carrier which drives the so-called sleeve gear, consisting of a bevel gear of 40 teeth and an ordinary gear on a bushing or sleeve which runs loosely or independent of the main shaft.

From the foregoing it will be seen that the sleeve gear should run the same speed as the main shaft, as there is a 40 driving bevel and a 40 driven bevel. The straight gear on the sleeve is the same on a good many frames as the gear on the frame shaft which drives the spindles. The gear on the end of the bobbin shaft tallies with the gear on the end of the spindle shaft; this is also true of the gear on the bobbin shaft. The bobbin gear generally have the same number of teeth as the gear on the spindle shaft and the spindle gear.

The sleeve gear turning the same number of revolutions as the main shaft, and then being geared through to the bobbin with gears proportionately or exactly like the train of gears which drive the spindles, the bobbin would turn the same number of revolutions as the spindles, no more and no less, and if such is the case, the bobbins would not wind the roving on, and therefore assistance must be sought from another quarter. This comes di-

rectly from the twist gear which is on the main shaft and drives the gear on the top cone, which drives (by the aid of a belt) the bottom cone.

These cones run parallel to each other, the large end of the top cone being opposite the small end of the bottom cone, and vice versa. There is a gear on the end of the bottom cone, which drives a double carrier which also drives a gear known as the fender gear. There is also another gear on the shaft which drives the large differential gear and gives additional speed to the bobbins.

To illustrate, take a Providence Machine Co.'s slubber running 250 revolutions a minute on the frame shaft.

250 revolutions of the frame shaft per minute.
56 gear on frame shaft.
56 gear on end spindle shaft.
55 gear on spindle shaft.
27 spindle gear.

$\frac{250\times56\times55}{56\times27}=509$ revolutions of spindles per minute.

By the above example it is intended to show that the bobbin turns exactly the same number of revolutions per minute, without any assistance from the cone belt. On the same frame the bobbin is geared up thus:

250 revolutions of the frame shaft.
40 bevel gear on differential, fastened to frame shaft; the two cross bevels are only carriers when the bottom cone is not running.
40 bevel on sleeve gear.
73 straight on sleeve gear.
73 gear on end of bobbin shaft.
55 gear on bobbin shaft.
27 bobbin gear.

$\frac{250\times40\times73\times55}{40\times73\times27}=509$ revolutions of bobbin per minute without cone belt.

The reader will readily perceive there must be some arrangement to wind on the bobbin what is delivered from the rollers, and the amount delivered from the rollers is obtained in this manner:

250 revolutions of the frame shaft per minute.
46 twist gear.
38 gear on top cone.
78 gear on end top cone.
130 gear on end of front roller.
1¼ diameter or 3.92 circumference of front roller.

$\frac{250\times46\times78\times3.92}{38\times130}=711.71$ inches delivered per minute at front roller.

To obtain the speed necessary to wind on the above, proceed as follows:

250 revolutions of frame shaft.
46 twist gear.
38 gear on top cone.
6 inches diameter top cone at starting point.
3 inches diameter of bottom cone at starting point.
27 gear on bottom cone.
70 double carrier gear.
64 double carrier gear.
56 fender gear.
14 fender gear.
110 differential gear.

$\frac{250\times46\times6\times27\times64\times14}{38\times3\times70\times56\times110}=33.96$ speed of differential gear.

The bevel gear that is fastened to the frame shaft runs in the opposite direction to the differential gear, running against or opposite the other motion, thus giving a double motion or speed to the sleeve gear. Therefore, multiply the speed of the differential gear as obtained from the cones by 2, thus:

$33.96\times2=67.92$ revolutions of sleeve gear per minute independent of the speed it receives from the bevel gear on the frame shaft.

Now add the number of revolutions given the sleeve gear from the frame shaft (which is 250) to the number of revolutions received through the cones, which is 67.92, thus:

$67.92+250=317.92$ revolutions of sleeve gear per minute.

317.92 revolutions of sleeve gear per minute.
73 teeth on sleeve gear.
73 teeth on end of bobbin shaft.
55 teeth on gear on bobbin shaft.
27 bobbin gear.

$\frac{317.92 \times 73 \times 55}{73 \times 27} = 647.61$ revolutions of bobbin per minute.

The bobbins turn 647.61 and the spindles 509 revolutions, therefore the gain is the difference between the two, thus: 647.61—509=138.61.

The bobbins are 1 5-8 inches in diameter or 5.10 inches circumference. 138.61×5.10=706.91 inches wound on per minute.

There was 711.71 inches delivered per minute by the rollers and the bobbin winds on 706.91 inches per minute. 711.71—706.91=4.80 inches to be accounted for that is contracted by twisting the roving. 4.80÷711.71=.674 per cent. contraction in twisting.

DOFFER.

Cop Dyeing.

Editor Textile World:

I see in your issue of June an editorial on cop dyeing. Inasmuch as I was with the Sayles Brothers, in Providence, for about three years, and working, among other things, on trying to make a success of cop dyeing as a business, I think that my experience might be valuable information to any others who are thinking of entering the cop-dyeing business. Your article says: "Cop dyeing has never been a great success, owing to the difficulty of obtaining uniformity of shade throughout the cop." This is not the real key to the difficulty. M. Charles Weber's machine which the Sayles Brothers exploited, dyed the cops through with the greatest uniformity, and the writer experimented with coal-tar colors, indigoes, and everything excepting alizarines. An aniline black, even, was obtained with success at the inventor's establishment in Alsace. There was no trouble whatever in making the colors regular, and reasonably fast. The real trouble was in matching lots dyed at different times. To the mathematical mind nothing appears more inane than the statement that it is impossible to obtain the same shade on two lots of goods dyed on the same machine, taking precisely the same amount of coloring matter, and following most conscientiously the same formula. But the writer, having served an apprenticeship, and had long practical experience, can only say that in dyeing, two and two do not always make four. The precise state of the facts in the dyeing industry is this: An order from the commission house always comes, "dye so many pounds *this* red." If the order came, "dye *a* red," there would be no trouble with cop dyeing. No latitude is allowed the dyer in his color. The writer is of the opinion that where absolute uniformity of shade throughout the whole order is not desired, or where the mill uses up its own dyeings, a very considerable use of cop dyeing might find application. But for commission work, there is no chance for success under ordinary conditions.

It might be as well to say something of the other machines and processes, placing Mr. Weber's as the first. A second is a cop-dyeing machine that I have seen in one of the machine shops of Providence. This was never in the market, so far as I know. A third form of machine is spoken of in the Consular Reports for Sept., 1892, page 152. This machine was on exhibition in Zittau, and it may work well.

Cop dyeing has always been a most attractive field because it saves the reeling of the yarn from the cops into the form of hanks for dyeing, and the re-winding, making the saving on medium numbers in New England from three to five cents a pound. But this saving cannot be effected in toto, because even if the lot is dyed all right there is trouble in the shutting of the dyed cops. This is the cause which gave much trouble to the cop-bleaching method, of which there are several modifications.

It seems, as a matter of fact, that in the mills the weavers are not willing

to take the trouble to shuttle the dyed or bleached bobbin. If the cop is in the least closed, the weavers fling more or less of the cop into the waste heap, and the saving of from three to five cents is transformed into a loss of three to five cents.

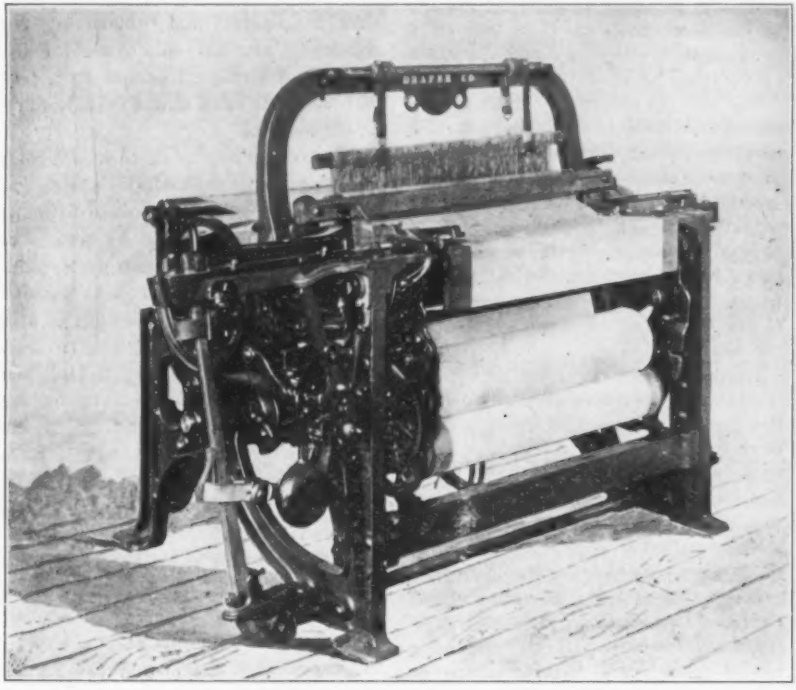
I write rather feelingly in the matter because we tried so hard to make the process a commercial success at Saylesville, but found that it was a contest in which failure was a foregone conclusion. To save other people chagrin I have written this letter, and hope that it will come to the attention of people who wish to try cop dyeing. My advice is "Don't."

H. HUNTINGTON,
Analytical and Consulting Chemist.

—The acid browns are as limited in number as the basic browns, but are very useful products in dyeing of wool and silk.

Draper's Common Loom.

We illustrate, herewith, a type of common loom for weaving cotton fabrics, made by the Draper Co., Hopedale, Mass. This company have felt it necessary to engage in the building of looms in order to have a machine adapted to the carrying of their devices, which have become so popular and thoroughly endorsed by a large number of our cotton manufacturers. Their effort has been to bring a loom up to the standard of the best cotton machinery that is made. The most important feature of this loom is that it is perfectly ready at any time to take the filling-charger or warp stop-motion, so well known as essential parts of the Northrop loom. It is not expected by this company to sell plain looms, i. e., those with single shuttle boxes not adapted for more than five harnesses, to manufacturers, except those who have not sufficient capital



DRAPER'S COMMON LOOM.

at the start, with which to purchase the improvements introduced by the company, or to those desiring to weave goods for which they consider the company's devices, in their present development, unadaptable.

The looms of the Draper Co. are now universally made without using right and left hand parts, except two or three pieces relating to the shipper mechanism. The pulleys on the loom are placed on alternate sides for convenience for belting as usual, but the shipper-handle is always on the left side, and the other motions are always in the same position, thus making a uniformity in the looms and a feature appreciated by operatives.

One of the features lately introduced into these looms is the use of a metal cloth-roll. This is made of iron pipe with holes for the insertion of wooden plugs, to which the filletting is attached. These rolls cannot, of course, shrink or swell, so that the picks in the cloth should be always uniform, and the filletting itself will not be broken through the swelling of the roll.

Another device regarded as of considerable importance, especially where fine goods are woven, is a new filling-brake, which resets itself automatically, and is so timed as to stop the loom with the shuttle in the box, so that the weaver is not obliged to make the extra motion of pushing the shuttle home before starting the loom.

The let-off motion is the original Bartlett with improvements. The friction is obtained by the use of a leather-faced metal clamp, positively adjusted by a screw thread tension. The Stearns picker-motion is used, and the take-up motion is simplified.

On the lay an adjustable flighter is used, so that all reeds can be accommodated and held securely.

All these looms are supplied with the Sullivan shuttle-guard without extra cost.

The teeth on the driving-gears are of peculiar form to save breakage.

The binders have a neat adjustable device, and great attention has been given to the shape of the shuttle-boxes. The crank arms are attached to an eccentric bushing, allowing adjustment for wear.

The Printing of Metallic Powders upon Calico.

S. BRADBURY, England.

Bronze printing, as the printing of metallic powders is commonly called, has of late assumed a new importance.

For convenience' sake the term "bronze" will be often used, as it is in practice, in speaking of metallic powders in general; and "thickening" for whatever medium employed, for the purpose of fixing the bronze in a pattern upon the cloth under consideration at the moment.

Bronze printing as an idea is not at all new, though the methods now in use and the effects obtained are so in many respects. The printing by means of the block of a pattern with paste, paint or varnish, and the subsequent passage of the cloth whilst the pattern is still damp into a box of "gold" dust (a bisulphide of tin), followed by drying and brushing to effect the removal of the particles of bronze adhering to the unprinted parts of the fabric, is a method which has long been employed by the printers of velveteens and similar cloths.

The earliest, or at least the most successful of early, methods of bronze printing by means of engraved rollers, were only adaptations of the above; the bronze and paste employed for its fixation being applied to the cloth separately. One of the plans often adopted was to have at the first trip in the printing machine, a roller engraved with the required pattern, but furnished only by a paste of albumen or kid glue; at the next nip a plain pad roller, provided with a box-doctor which contained the bronze; the powder naturally attaching itself to the printed parts of the cloth. A circular brush removed the loose particles of bronze as in the preceding case. This method was, however,

troublesome and wasteful; whilst the color itself was not near so fast to rubbing as that which is being printed nowadays.

A word in passing may also be said as to the means which have, up to late, been often employed in obtaining silver effects upon cloth. These were all, in principle, but variations of the process of tin-foiling paper. Thus metallic tin (feathered) dissolved in acid, precipitated by means of zinc plates, washed, put through a fine sieve, and then mixed with the printing paste, has been employed. A mixture of tin crystals, zinc-dust and paste, has also been used; whilst a third method has been the printing of a paste of albumen or casein and zinc powder, with subsequent drying and ageing of the cloth and a passage through a bath of perchloride of tin. In all these cases, however, the finely divided tin in the pattern is but of a dull appearance after printing, drying, etc., and a hot and heavy calendering is always necessary to bring up the required metallic lustre. In certain cases this heavy calendering is a disadvantage; the silver also is not fast to washing or rubbing.

Bronze printing has been practically in abeyance for a long time. Within the last two years there has been a revival of the style, however, and the success of a method of printing fast bronzes upon fabrics by means of stencil plates has given an impulse to experiments with a view to equally good results amongst calico printers.

Many firms are now printing these powders with ordinary engraved rollers with much less waste and better work in the way of fastness than by older methods. Bronze patterns are thus being used effectively in many ways, as outlines or in other ways, in combination with ordinary colors, to give metallic effects upon a black, navy or other plain dyed ground; as covers upon printed grounds—over discharge-colors upon aniline black, for example, and as stripes in caustic crèpons.

The various mediums suggested and used as thickenings for the bronze colors may be classed, with remarks upon them where necessary, as follows:

(*a*) Silicate of soda.

(*b*) Ordinary albumen paste.

(*c*) Glue. A kid-glue paste of 8 pounds to the gallon is employed. In this case a false bottom is affixed to the color box so that it can be heated by steam.

(*d*) Shellac varnish. Digest shellac in 5 parts methylated spirits, or to thickness required.

(*e*) India-rubber solution. The ordinary solution as used by calico printers is quite suitable, when of a medium thickness, to use for this purpose. Should it become too thick during use as a color, it can be diluted with the required amount of naptha. To those desirous of experimenting in making their own india-rubber solution, the following receipt can be recommended:

One pound India-rubber (unvulcanized) shavings. Digest in a jar over a sand bath with
2 lbs. Camphene.
2 lbs. Naptha. When dissolved, add
½ lb. Copal Varnish.

COPAL VARNISH.

This may be made as follows:
8 lbs. copal. Fuse, then add
2½ gals. drying oil, and afterwards
¼ lb. camphor. Cool to 60° C. and add
20 gals. turpentine. Mix with
1 gal. slaked lime. Stand three days and draw off the clear portion.

(*f*) A paste consisting of
3 parts India-rubber solution.
1 part of a solution of wax in naptha, 46 lbs. to gallon.

This, although a little better to print, does not give as good results in the way of fastness as the india-rubber solution alone.

(*g*) An ordinary, quick-drying varnish. Of these there are a number to choose from. Many of the firms who are printing bronzes have varnishes made specially for them, the exact composition and process of making the same being kept secret. Certain manufac-

turers, however, are now sending out varnishes for the purpose every whit as good as these, and which there should be no difficulty in obtaining. The mixture used by S. H. Sharp of Leeds (England), in his stencil plate process for the printing bronzes, and made public in his specification, may be taken as a type of these. He describes it thus:

Two compositions "A" and "B" are used. "A" is composed of gum arabic, linseed oil, oil of resin and dextrine, boiled together to a syrup-like consistency. "B" is made by first boiling together, for about three-quarters of an hour, linseed oil and red lead, then incorporating with this mixture litharge and turpentine, boiling the mixture for about an hour, and, when cold, filtering it through a woolen bag.

The mixtures "A" and "B" are incorporated together in the cold state in the proportion of about four parts by weight of "A" to one part by weight of "B," forming a liquid with which any desired aniline or other bronze, or aluminum, powder is mixed in the proportion of about three parts by weight of the liquid to one part by weight of the powder. The following proportions have been found advantageous:

MIXTURE (A).

Gum Arabic	16.6	parts by weight.
Linseed Oil	50.0	" " "
Oil of Resin	16.7	" " "
Dextrine	16.7	" " "

MIXTURE (B).

Linseed Oil . . .	20 gals.
Red Lead . . .	40 lbs.
Litharge . . .	40 "
Turpentine . . .	80 gals.

To be continued.

Cotton Spinning in Japan.

From the bi-annual reports of 29 Japanese spinning concerns, as published in one of our foreign exchanges, we find very satisfactory results. The highest rate of profit averages 5.9817 yen (a yen in United States currency is valued at about $1.00 gold and 50 cents silver) per spindle, and the lowest 1.1451 yen. The rate of dividend ranges between 20 and 8 per cent. per annum. Besides this, it is reported that additions to the reserve funds have been made by every one of the companies. All of them, in fact, are arranging their affairs upon a stable basis. It is a well-known fact that the cotton spinning industry is steadily growing in Japan. The condition of this industry in the latter half of last year was remarkable for the fact that the market throughout continued rather dull. During the six months under review the average price of cotton yarn did not exceed 91.40 yen per bale (400 English pounds). This shows a falling off of about 1.80 yen per bale as compared with the average price (93.20 yen) for the corresponding period of the previous year (1895). With regard to the cost of production, the value of coal in the corresponding period of the previous year averaged over 16 yen per 100 piculs (a picul is equivalent to 133 1-3 pounds), while the wages of operatives averaged slightly more than 18 sen per day for male and 10 sen for female operatives. During the last half year the value of coal went up to over 18.50 yen per 100 piculs, and the wages of operatives advanced to more than 20 sen for male and over 12 sen for females. The cost of production, in other words, was raised considerably, while the value of yarn declined. It would thus appear to be very difficult to realize a profit in this industry. Such is not the case, however, as the returns conclusively show. The profits are explained by the fact that raw cotton was cheaper in the latter half of 1896 than in the corresponding period of 1895. This is the principal cause of the satisfactory results shown. For the latter half of 1895 American raw cotton was quoted on an average at 27 yen per picul; Indian raw cotton at 22.75 yen, and Chinese raw cotton at 22.50 yen, but there was a sharp fall in the latter half of last year, American cotton going down to 24 yen, Indian cotton to 20.65 yen, and Chinese cotton to 21.20 yen per picul.

WOOLEN DEPARTMENT.

Science and Practice of the Construction of Woven Fabrics.

FRED. BRADBURY.

(Continued from July.)

Now, if wool were a solid substance, the theory as expressed in my last article would be absolutely correct, but since the wool fibre is of a cellular structure, it necessarily contains air spaces within its circumference; and since the yarn is composed of fibres, there are numerous small air recesses within the circumference of the yarn, consequently the actual diameter of the yarn is greater than is obtained from its specific gravity. If it were possible to correctly determine the amount of air space there is within the circumference of the yarn threads, then the absolute diameter of the threads would be readily ascertained. Taking the full range of yarns made, the air space may be anything from 20 to 30 per cent. In most of the two-fold worsted yarns it is generally about 20 per cent., but not less. This percentage of air space within the circumference of the yarns may be useful in assisting us to a determination of the maximum amount of compression to which the yarn should be subjected.

I have no hesitation in saying that the diameter of threads thus obtained gives a result which may be safely applied to the construction of woven textures. The foregoing theory gives a result which agrees with the 2nd and 3rd methods referred to in the generality of cases, but the diameter as obtained by the 3rd method is an unchangeable one, while in reality the diameter of the yarn is a constantly varying quantity, even though yarns of the same counts be selected. In the last theory given, this varying factor is taken into account. Having established a theory for finding the diameter of any given thread, it is comparatively easy to find that of any other. The general idea is that the diameters of threads vary inversely as the square root of their count, and this would be correct did the density of yarns remain constant.

It is well known that the more twist a yarn receives or the harder it is spun through excessive drag, the firmer and denser it becomes, and consequently its specific gravity is increased. The following may be taken as examples: A full spool dragged hard on the fly frame, a soft spun spool on the cap frame, and a softer one still upon the mule. These will each respectively produce a thread with a relatively increased diameter, and in cloth construction these factors have a modifying influence; *e. g.*, when it is required to produce a light all-wool dress fabric which shall be loose in the setting and yet not slip, but handle full, the yarn spun upon the worsted or woolen mule will be best calculated to give satisfaction.

There are two important factors which mainly influence the relative diameters of threads. (I.) The diameters of threads vary inversely as the square root of their counts, based upon the well known principle of the variation of circles; *e. g.*, compare circle A, of 1 inch diameter, with circle B, of 2 inches. (T equals 22÷7. See previous article.)

$$\frac{\text{Area of A}}{\text{Area of B}} = \frac{Tr^2}{Tr^2} = \frac{\frac{22}{7}\times(\frac{1}{2}\times\frac{1}{2})}{\frac{22}{7}\times(1\times1)} = \frac{\frac{1}{4}}{1} = \frac{1}{4}.$$

$$\frac{\text{The diameter of A}}{\text{“ “ “ B}}=\frac{1}{2},\ \text{but area of}\ \frac{A}{B}=\frac{1}{4},$$

which, it will be seen, is in the proportion of the squares of their diameters. This means, then, that the diameters of circles vary as the square roots of their areas. Now, since the cross section of a thread may be represented by a circle, and since, as the counts increase, the diameters of the threads decrease, it follows that the diameter of threads must vary inversely as the square roots of the areas of their cross section; *e. g.*, prove that the area of the threads of 1's and 4's worsted vary in the inverse ratio of their counts.

By the application of the 3rd or 4th method, the diameters of 1's and 4's worsted equal $\frac{1}{21}$ and $\frac{1}{42}$ part of an inch, respectively. Then:

$$\frac{\text{Area of 1's worsted}}{\text{Area of 4's worsted}}=\frac{\text{Tr}^2\text{(1's)}}{\text{Tr}^2\text{(4's)}}=\frac{\frac{22}{7}\times\left(\frac{1}{42}\times\frac{1}{42}\right)}{\frac{22}{7}\times\left(\frac{1}{84}\times\frac{1}{84}\right)}=\frac{1}{\frac{1}{4}}=\frac{4}{1}.$$

Consequently, if we substitute counts for area of cross section of thread, it will be obvious that the diameters of threads, other things remaining constant, vary inversely as the square roots of their counts.

(II.) Apart from any change in counts or numbers of yarn, its relative diameter varies in the inverse ratio of the square root of its specific gravity; *e. g.*, compare the relative diameters of thread A, of specific gravity 1.3, with that of thread B, of specific gravity 1.5.

1 cubic foot of water weighs 1000 ozs.
1 cubic “ “ A thread$=1000\times1.3$ ozs.
1 cubic “ “ B “ $=1000\times1.5$ ozs.

Then 560 yds.$\times$(36 in.)Tr^2=No. of cubic in. in 1 lb. of 1's worsted, A or B.

Also $\frac{1728}{1000\times1.3}\times16=$ “ “ “ “ “ “ “ “ “ “ A.

Further $\frac{1728}{1000\times1.5}\times16=$ “ “ “ “ “ “ “ “ “ “ B.

$$\text{Then}\ \frac{r^2A}{r^2B}=\frac{\frac{1728\times16}{560\times36\text{T}\times1000\times1.3}}{\frac{1728\times16}{560\times36\text{T}\times1000\times1.5}}=\frac{\frac{1}{1.3}}{\frac{1}{1.5}}=\frac{1.5}{1.3}$$

$$\therefore\ \frac{r^2A}{r^2B}=\frac{1.5}{1.3}$$

$$\therefore\ \frac{rA}{rB}=\frac{\sqrt{1.5}}{\sqrt{1.3}}$$

$$\therefore\ \frac{\text{Diameter A}}{\text{Diameter B}}=\frac{\sqrt{1.5}\times2}{\sqrt{1.3}\times2}=\frac{\sqrt{1.5}}{\sqrt{1.3}}$$

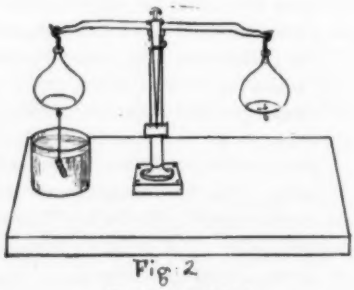


Fig. 2.

(See July article.)

This is simply a ratio, but proves that the diameters of threads vary in the inverse ratio of the square roots of their specific gravity. As is well known, many woolen yarns vary very considerably after having been spun for some time, and this is due to the fact that their density or specific gravity has been increased.

(To be continued.)

Mathematics in Textile Work.

BY THOMAS R. ASHENHURST.

(Continued from July.)

In dealing with the twist of yarns another set of mathematical problems are raised, for either the actual or relative diameters of threads must be dealt with. It may be said that it is practically impossible to determine the actual diameter of a yarn of any given count, because the bulk of the thread will vary according to the quality of the material or the number of turns. I will endeavor to show that this can be determined with a sufficiently near approximation to truth to serve all practical purposes. The question may be asked at the outset, how many turns per inch should any yarn of a given count have? Every spinner may have his own method of determining this, and the number may vary according to the quality of the raw material, or according to the purpose for which it is being made; but, as in all other cases, there may be what might be termed a mean or average twist, or it may be termed a standard number, and all above would be hard twist, and all below it, soft twist. In the cotton trade there is a general rule, viz.: Multiply the square root of the counts by 3 1-2 for weft and by 3 3-4 for warp. Then for any degree of hardness or softness, or for yarn for any special purpose, the spinner would exercise judgment. Suppose then that the number of turns has been found for one count of yarn of a particular class or quality, then it would be necessary to retain exactly the same relative number for any other count to preserve the character of the thread.

Threads may be treated as cylinders and their sections as circles. Areas of circles vary as the square of their diameters. Therefore, the sectional areas of threads will vary as the square of their diameters. But the system of indicating the counts of yarns refers to their weights, not measurements, consequently the counts can be taken only as indicating their *relative* bulk for the present purpose. For instance, in speaking of 40's and 80's cotton, the numbers indicate that one is twice as heavy as the other, but their diameters will not be as two to one. Seeing that the numbers indicate the relative weights of threads, or it may be said for convenience, their relative sectional areas, their diameters will vary as the square roots of the numbers indicating their weights, just as if areas of circles were given, their diameters would vary as the square roots of those areas. Again, seeing that in nearly every system of counting yarns the higher numbers indicate the finer threads, there will be the greatest number of turns per inch in the highest numbers, or in other words, the turns per inch increase as the counts increase. To some this may appear at first sight somewhat paradoxical, but a moment's reflection will show that it is correct, for if one thread be half the diameter of another, and the twist in both bear the same relation to the diameter, those in the fine thread will occupy half the space occupied by those of the thick thread; hence, there must be double the number per inch.

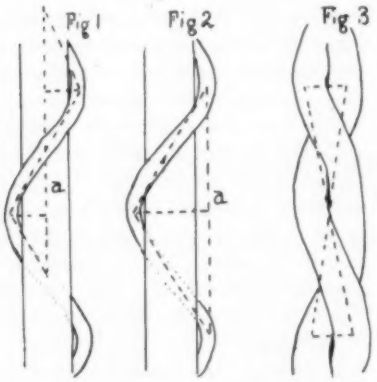
It follows then from this that the number of turns per inch having been found for any one count of yarn, either by experiment or otherwise, the number of turns for any other count of exactly similar yarn may be found by the general rule: As the square root of one count is to the square root of another count, so is the turns per inch in one to the turns per inch in the other. To simplify the working, square the number of turns in the given yarn, multiply this by the counts, and divide by the second count; then extract the square root. Thus, let "a" and "b" be the counts and "t" the turns per inch,

then $\frac{\sqrt{a \times t^2}}{b} = x$.

Another question which is often a source of trouble in yarns is ascertain-

ing the amount of take-up in twisting; that is, how much the yarn is shortened in length and increased in weight by one thread coiling round the other, or by each thread partly coiling around the other. This is usually determined by experiment, but sometimes the experiment may prove a rather costly one, for if the exact result is not obtained, the resulting yarn may be either too heavy or too light, and although no mathematical system can give absolute accuracy in yarns, yet they may approximate so near as to be reliable guides.

If a very thin thread is coiled round a thick one there will be no bending take place in the thick thread, consequently the thin thread will form, as it



were, two triangles at each half turn, as shown at Fig. 1 by the dotted line, *a*, or it may be more conveniently taken as two triangles for each turn, as at Fig. 2. Then to find the length of yarn taken up in coiling it is necessary to find the hypothenuse of these triangles. It is needless to say that the length taken up will vary considerably, according to the number of turns per inch.

To illustrate this clearly, suppose the two yarns to be 20's worsted and 40's silk, then the diameter of the worsted would be $\frac{1}{105}$ of an inch, and that of the silk would be $\frac{1}{183}$. Then add these two diameters together and it will give the base of the triangle. Thus, $\frac{1}{105}+\frac{1}{183}=\frac{1}{67}$ nearly. Suppose there are 8 turns per inch in the twist, then $\frac{1}{67}$ will be the base, and $\frac{1}{2}$ the altitude of the triangle. Therefore, $(\frac{1}{68})^2+(\frac{1}{2}\div 2)^2=\frac{1}{4624}+\frac{1}{256}=\frac{1}{324}$, and $\sqrt{\frac{1}{324}}=\frac{10}{154}$ nearly, or 3¾ per cent. take-up. That is, the length of silk yarn used would be 3¾ per cent. greater than the worsted.

This formula, although apparently correct is not strictly so, for the threads, instead of being flat ribbons, as this supposes, are cylinders, therefore, instead of taking the diameter of the thick thread to find the base of the tri angle, half the periphery should be taken. See how this works out. The diameter of a circle is to its circumference as 1 : 3.1416. Then the diameter of the worsted thread is $\frac{1}{105}$, and $\frac{1}{105}\times 3.1416=\frac{1}{33}$, the periphery of the thread, and $\frac{1}{33}\div 2=\frac{1}{66}$. Add this to the diameter of the silk to find the base of the triangle and we get $\frac{1}{66}+\frac{1}{183}=\frac{1}{48}$. The altitude of the triangle is $\frac{1}{16}$ of an inch, then $\sqrt{(\frac{1}{48})^2+(\frac{1}{16})^2}=\frac{100}{1516}$, or a little over $\frac{1}{15}$ of an inch of silk to make $\frac{1}{16}$ of an inch of folded yarn, or a shrinkage of 5.25 per cent. I have ignored some small fractions in working, as they would be troublesome and would not materially affect the result. This means then, that 5¼ per cent. more length of silk would be required than worsted to make this folded yarn. Theoretically, this solution would be true, but if any variation of the tension be made in the threads in the process of twisting, the silk may cause the worsted to bend and so reduce the base of the triangle, and it must be borne in mind that the relative bending powers of threads bear the same ratio to each other as other bodies, viz., as the cubes of their diameters.

Suppose now that two threads of equal counts and material are to be twisted, as is usually done, except for fancy yarns. In that case both would possess the same power of bending. Therefore, they would present the appearance shown at Fig. 3, and would in fact form one solid even thread. Then in this case it would not be correct to

add the diameter of one to half the periphery of the other, but to find the diameter of the compound thread as though it was a solid one. Let the yarns be 30's worsted. The two fold would be equal to 15's, and the diameter of 15's is, practically, $\frac{1}{9\frac{1}{2}}$ of an inch. Then $\frac{1}{9\frac{1}{2}} \times 3.1416 = \frac{1}{2\frac{9}{9}}$. If the yarn has 14 turns per inch, then $\frac{1}{14} \div 2 = \frac{1}{28}$. So that the base of the triangle would be $\frac{1}{29} \div 2 = \frac{1}{58}$, and the altitude $\frac{1}{28}$, and $\sqrt{(\frac{1}{58})^2 + (\frac{1}{28})^2} = \frac{100}{2881}$, or a shrinkage of 3.6 per cent. That is, the length of the two fold yarn will be 3.6 per cent. less than the original single yarns.

The question will naturally occur to many, how is the diameter of a thread ascertained? I will explain that presently. Meanwhile there is another question connected with folded yarns, which should receive some attention, viz.: How to ascertain the weight of each material required to produce a given weight. When the two are alike it is, of course, quite easy, and when they are not alike it is a matter of simple proportion.

The next question, then, for consideration is the diameters of threads. It may be asserted that there is no means of determining the diameter of threads of any given count of yarn, as it will vary according to the quality of the material and the amount of twist, etc. I should at once say that quality of material will not affect the question, as all fibres of one class have practically the same specific gravity. Therefore, it would simply be a question of the degree of density or the relative compression of the fibres forming the thread which would cause a difference in bulk or diameter. If yarns be made from two classes of wool, for instance, pure lustre and merino, respectively, the latter will form what is termed a more lofty thread, and appear to be more bulky. Simply because of its character it does not lay so flat in the thread, yet when subjected to the same degree of compression, if the specific gravity is the same, the two will have the same diameter for the same counts of yarn. I will endeavor to prove this presently. I will explain first how the diameters of yarns has been determined, and a ready means of finding the diameter of a thread of any count.

Some years ago I spent a considerable amount of time trying to ascertain the actual diameters of threads of different counts and materials. I obtained samples of yarns in cotton, worsted, woolen, linen, silk, mohair and alpaca, in all possible counts, from 200's cotton downward, and twisted hard and soft for different purposes. In each material and count I took 20 micrometrical measurements from one thread under three conditions; first, held tight; second, laid perfectly loose and free; and third, just held at a tension to keep the fibres straight. Then I took the average diameter as found under the first and second conditions, respectively; next the average of the two conditions combined, and compared with the average under the third condition. In nearly all cases the result was a practical agreement between the averages of the first two combined and the third, just as might be anticipated. To illustrate the process more clearly, I will take cotton and show what was the treatment. Twenty measurements were taken of 200's and the average found. The same with 190's, 180's, etc., moving in tens down to 100's, then in fives down to 40's and in twos down to 10's, and a table made of those averages. Of necessity these measurements showed some discrepancies. It was necessary to correct these. Then assuming that the measurements of the 200's was correct, and working on the basis that the diameter varied as the square roots of the counts, I proceeded to determine the diameter of all counts down to 1's in the basis of this measurement. Next, assuming that the measurement of 190's was correct, I worked out the diameter of all the others from that, and so assuming each number in

succession to be correct. The diameter of all the others were worked from each. Then an average taken from all these workings, so that any errors in the measurement of any one thread was corrected from the measurements of all the others, and from this a table was constructed of the diameters of threads.

From this table deductions have been made to facilitate the means for ascertaining the diameter of a thread of any counts. The result, briefly, of these deductions, is that the square root of the yards per pound, minus ten per cent., will give, in all cases but woolen yarns, the exact diameter of the thread as given in the tables; and seeing that the measurements upon which the tables are based are of gray yarns, and that the average loss or shrinkage of yarn in the process of dyeing and finishing after weaving is about ten per cent., the square roots of the yards per pound may be taken as representing the diameter of the thread in the finished cloth, and so form a fairly reliable basis for determining the number of threads per inch to produce a cloth of any given pattern. To illustrate this, suppose it is required to know the diameter of 20's cotton. $840 \times 20 = 16{,}800$ yards per lb., and $\sqrt{16800} = 129$, or $\frac{1}{129}$ part of an inch.

(To be continued.)

Textile Ornamentation.

By Fenwick Umpleby, Graduate of Yorkshire College, Leeds, England, and Instructor in Textile Design, at the Lowell Textile School.

Continued from July.

It was at Babylon where were produced those magnificent and marvelous coverings for the couches set apart for the guests at the great banquets, and which are said to have cost thirty-two thousand pounds sterling. The Babylonians were also very skillful in weaving large designs of many colors; their cloths were very rich, woven with figures of animals, fishes and birds; sporting subjects also ornamented their fabrics, as hunting, fishing and shooting. Their brocade included those subjects for design. The colors mostly used included scarlet, blue and purple, enriched by gold and silver threads. Silk seems to have been for a very long time the monopoly of China (some writers say the exclusive monopoly of the Chinese), until the second or third century before the Christian era, and it is very difficult to say exactly when it first found its way from China to Egypt. In the books of Ezekiel and Proverbs, we read of this precious thread, but there is much doubt as to the translation of the Hebrew word when used; some historians affirm that silk was unknown to the Israelites. It is, nevertheless, true that the Egyptians had some knowledge of a thread very much like silk, procured from certain worms, which they spun and manufactured into a material of a very thin and transparent character, and of a very silky appearance, but said to be of an unsubstantial nature. It is natural for us to come to the conclusion that each country or people would use such materials as were obtainable by them, and we find that wherever civilization has found a footing, the people have shown traces of ornamenting textile fabrics made from such materials as their country produced. In the absence of silk (which had not found its way into Egypt until the second or third century before our era), cotton, linen, flax and wool, with gold and silver thread interwoven, sufficed the Egyptians in the manufacture of their textile goods. We gain some idea of the quality of the fabric and of the skill of the Egyptian workman, by examining the piece of mummy cloth exhibited in the British museum, sent to England by Mr. Salt. It is a piece of linen made from a thread, one hundred hanks to the pound, or eighty-four thousand yards in one pound avoirdupois weight; one hundred and forty threads per inch in the warp and sixty-four picks per inch in the weft. In his "Handbook of Textile Arts," to the South Kensington museum, the Very

Rev. Daniel Rock, D. D., tells us of a cloth or piece of linen obtained at Thebes, which was one hundred and fifty-two threads per inch in the warp and seventy-one picks per inch in the weft. We read in Exodus of the very extensive use of gold thread or wire and twisted linen; also of the workmanship and manipulation in making the gold thread: "And they did beat the gold into thin plates and cut it into wires, to work it in the blue, and in the purple, and in the scarlet and in the fine linen, with cunning work" (Exodus xxxix, 3), thus giving us their ideas in the perfection of color, and leaving us to imagine that their "cunning work" was the result of superior skill and of great ingenuity.

The inspired Psalmist, speaking of the king's daughter, says: "Her clothing is of wrought gold, and she shall be brought unto the king in raiment of needle work" (Psalm xiv, 13, 14). Herodotus, speaking of Egyptian workmanship, tells of a piece of linen which was especially to be admired, as each twisted thread contained no fewer than three hundred and sixty strands, and upon it were interwoven vast numbers of figures of animals. From these extracts we may be assured that when they could card and spin cotton, linen and flax to such a high degree of perfection, the fabrics produced from these fibres must have been beautiful, and therefore they could well afford to dispense with the silk. The Egyptians were satisfied with the products of their own soil, along with cotton imported from India, which was manufactured into textiles. They were most famous for striped cloth, figured fabrics, plushes and velveteens, and for their curious fabrics, specimens of which are to be seen in many of the public museums. It is very evident from the book of Exodus that needle work and embroidery were the chief methods adopted for ornamenting woven goods amongst the Jews; but the word embroidery may in some instances refer to weaving, and not always to the work of the needle. Egyptian tapestry was ornamented with paintings as well as embroidery. We read in the book of Proverbs (vii, 16), "I have decked my bed with tapestry, with carved works, with fine linen of Egypt." Dr. Rock, in his work on "Textile Fabrics," renders the text, "I have woven my bed with cords, I have covered it with painted tapestry from Egypt." Thus we find that linen was not only used as household furniture amongst the Israelites, but that it was really manufactured in Egypt. It may here be asked, how was it that the Egyptians did not avail themselves of the valuable discovery of silk, which, according to Chinese historians, was in existence upwards of three thousand years before our era? We may answer in the first instance, as previously stated, that probably the Egyptians were content with their own productions, namely, linen, flax and wool. When the Jews were emigrating from Egypt, whence they procured their costly materials, they had no silk included in their valuables, nor do they seem to have knowledge of any fabric, except linen, cotton and woolen. Secondly, it may have been owing to the very jealous disposition of the Chinese people, and to their desire to keep the monopoly of the manufacture to themselves, for at last when the silk worms were brought to the West, they were carried from the country by stealth; or it was because that they shut themselves up from all communication with the West, so that if silk had been manufactured in quantities large enough for exportation, it would have found no outlet for exportation to other countries. The Chinese are a very suspicious people; if they had any project advanced to them by a foreigner, which ought to be to their mutual advantage, they would cheat the foreigner out of it if they could, but will not generally accept any foreign innovation which would prove a benefit to both parties.

We must give them credit for being exact, but of small ideas; they are industrious, but conservative in their notions and habits; hence, the great similarity between their designs for textiles of some thousands of years ago and those of the present day. We must now return to their remarkable manufacture of silk, which they undoubtedly kept to themselves so very many centuries. Aristotle is the first Greek author who mentions the valuable insect, the silk worm. He states that silk was first woven on a small island in the Grecian Archipelago, named Cos, the modern name of which is Stanco. At this place, the ancient writer tells us of Pamphile, the daughter of Platos, who was the first one to weave silk.

(To be continued.)

Calculations.

Of much importance in the calculations required in the finishing room is the ability to determine the contents of tanks and other receptacles in which the soap, speck dye or scouring liquor is to be made. This is necessary in order to determine just how much of each of the ingredients it is required to put in, and not trust to guess-work. When the exact contents are known, the whole matter is reduced to a certainty, and is the most satisfactory way. The rule employed to figure the contents of tanks, etc., is simple enough, still, to one with limited education, a few words of explanation are necessary.

To simply say: Multiply the diameter by the diameter in inches, this by the depth in inches, and the result multiplied by .0034 will give the liquid gallons contained in the tank, is, to many, a meaningless formula. To make things plain, take, for example, a tank 36 inches in diameter, so that according to the rule we shall have to multiply this 36 by 36, which gives 1296; and this again multiplied by the depth, which is 48 inches, would give 62208.

The first operation, 36×36, gives the square inches of the surface, but by multiplying by the depth (48) the cubic inches contained in the tank are obtained.

To reduce the cubic inches to gallons, according to the rule, multiply by .0034. This is a decimal fraction and is expressed thus: thirty-four ten-thousandths. The operation is simplicity itself when once properly understood, for by using this decimal fraction in the regular way the whole process is considerably shortened. Simply multiply 62208 by 34, and then four places from the right put the decimal point. The figures to the left of this point are whole numbers, and those to the right, fractions. This we find to be 211.5072 or $211\frac{5072}{10000}$ gallons. The fraction is a trifle over one-half, and therefore 211-1-2 gallons would be about correct.

A somewhat simpler method than this is, after the cubic inches are obtained, to divide by 294, which will give very nearly the same result as the other operation, at any rate near enough for all practical purposes.

It must be remembered that these fractional parts of a gallon are not of any importance, as the tanks are never filled to overflowing, and even if we should try to do so, we would find in nine cases out of ten that the tank sets hardly level enough to accomplish that.

It is not always that tanks are exactly square, but are often found larger one way than the other. Of course it is easily seen that this does not make any difference in the figuring, for after we measure both ways and multiply we have the square inches, and this multiplied by the depth gives the cubic inches.

Another very important branch of figuring which does not apply to the finishing room alone, but is of use in almost every department of either woolen or cotton mills, is the figuring of speed. It is surprising how few have mastered this simple problem, for no matter what mill you go into you will find more overseers ignorant on this subject than those that are posted on it.

A new machine arrives and is placed. After the proper alignment and fastening, the question of the size of driving pulley to put on the shaft, arises. As the number of revolutions the driving shaft makes are either known or easily ascertained, so the number of revolutions the machine is required to make is known and the size of the driven pulley on the machine, it only remains to find what size pulley is required to give the desired speed to the machine.

To find this, multiply the diameter of the driven pulley by the number of revolutions it is intended to have the machine run, and divide the product by the number of revolutions of the driving shaft. Wherever possible, use cancellation in figuring, and on all problems of this nature this method can be employed to advantage. It often happens that there are pulleys whose diameter is a mixed number. We will select an example of this nature for explanation.

Suppose that the speed of driving shaft is 150 revolutions, and the speed of the machine is to be 180 revolutions, with a pulley of 12 1-2 inches diameter. To do this example quickly, reduce the mixed number, 12 1-2, to halves, which would be $\frac{25}{2}$, and according to that, the example would stand $180 \times \frac{25}{2}$. But in order to be right, also reduce the divisor, 150, to halves, which would be $\frac{300}{2}$. Now treat both numbers as though they were whole numbers, thus: $180 \times 25 \div 300 = 15$ inches as the size of pulley required.

If, however, it is required to find the size of the driven pulley which shall make a certain number of revolutions, the size of driving pulley and number of revolutions of driving shaft being known, multiply the diameter of the driver by its revolutions, and divide by the number of revolutions the driven pulley is required to run; the result will be the size of the driven pulley. This applies chiefly to the speed of the counter shaft, and is used mostly to utilize what pulleys may be on hand, thus obviating the buying of more. Again, if it is required to find the number of revolutions a driven pulley of certain size will make, multiply the diameter of the driving pulley by the number of revolutions it makes, and divide by the diameter of the driven pulley; the result will be the number of revolutions the driven pulley will make. The close study of the questions in figuring will always be found to the mill operative's advantage; for a man who can give an intelligent answer to any question of this kind, is certainly preferred to those who always say "I don't know." T.

—The decoration of woven fabrics has hitherto been chiefly accomplished by the following means, namely: 1st, by the dyeing of plain cloths woven from materials in their natural colors; 2nd, by the use of warps and wefts, dyed in one, two, or several colors, and woven in stripes and checks by arrangements of special mechanical appliances; 3rd, by diaper and damask patterns being woven in the structure of the fabric by means of dobbies and Jacquards, both costly adjuncts to the loom; and, lastly, by the various processes of printing.

—It is not easy to conjecture, and quite impossible to fix with certainty, the time when the wools, downs, hairs (independent of their backing of skin), and silks and vegetable fibres were first utilized for the manufacture of textile fabrics; but we shall not be far astray if we venture to affirm that it would be a considerable time after man first appeared upon the planet, and that the order of their adaptation to this purpose would be that in which they are enumerated above.

—It will be safe to assume that the materials first utilized for purposes of clothing would be the skins of beasts and birds, the produce of pastoral pursuits or of the skill of the hunter. Many vestiges of the habit of utilizing these things have survived to the present day.

KNITTING DEPARTMENT.

The Knit Goods Situation.

Now that the weather is more seasonable, jobbers are able to sell fancy hosiery, particularly Roman stripes, with black grounds, plaids and tan and mode shades. Fancies are gradually gaining on black, partly because of the desire to match gowns.

The seasonable weather, too, has improved the demand for light weight underwear for immediate delivery. Especially is this true of men's light balbriggans and women's ribbed goods.

The late "peremptory" sales of underwear, have been as successful as could be expected, considering the lateness of the season. These sales have many of them been well attended, but prices in the aggregate could scarcely be called fair.

An importer, whom we met the other day, talks hopefully, although he is doing practically nothing just now. He bases his hopes mainly on the low stocks in the hands of retailers. He believes as much as ever in foreign supremacy on the finer grades.

Naturally, cotton knit goods have most felt the effect of the hot weather. This leaves dealers in so much better shape for ordering fall and spring goods. Such duplicate orders, as have been received for fall cotton goods, have not often gone above medium grades; the same is true of early spring orders.

Fleeced underwear is in good demand and steady, although large stocks are available.

Bicycle stockings are in demand, all grades being in request, but outing stockings and sweaters are quieter. Woolen and worsted goods are as quiet as usual at this time. Still, a few manufacturers in woolen lines are brisk.

It is always difficult at the end of the season to say just how prices are, for dealers in rounding out their wants, in a majority of cases say: "Lend us —— to sell at ——." On this tail end business they leave it to the jobbers to do the best possible thing for them. The same is also true in a lesser way of early spring orders, which makes it impossible to establish quotations with any certainty.

The same unevenness in the distribution of business that has been so marked for a year, continues in the various lines. Now that the tariff has become a law, the trade has a basis on which to figure and the effect has already been apparent.

Before closing I must say a word about the superlatively gay hosiery for women. It breaks the record. Early in the season fancies were neglected, everyone prefering to keep within more conservative lines, because of business uncertainties. But cycling has brought about a great sweep. The great number of designs demanded and the frequent changes that most women require, are the most important outcome.

It will not do for a woman to be frequently seen on her "bike" with stockings of the same pattern, unless she wishes to become known as "Miss Checker Legs," "Miss Striped Legs," and so on.

The high cycling boot is fast on the wane, for women like to appear graceful. In addition, more expensive grades are beginning to be asked for, for, being so conspicuous, more attention is called to their quality. The zig-gag designs called "Persian," promise to rival plaids in popularity for a time. Old and young alike have just now the fever for fancies.

Leipzig Exhibition.

HOSIERY EXHIBITS.

JAMES H. QUILTER.

The present exhibition now being held at Leipzig, Saxony, is representative of the industries of Thuringia, Saxony, only. Though not an international exhibition, there is much to interest an ordinary visitor, and at a glance shows the vast strides these countries have made in regard to manufactures. It is customary to look upon these countries as agricultural districts, but various manufactures have so rapidly come to the front that they hold an important position in the manufacturing world. Leipzig, being so near the Saxony hosiery district, of which Chemnitz forms the chief centre, it would be expected to find this industry represented somewhat on a large scale. Tnough there are comparatively only a few exhibitors, their exhibits are of such a nature as to be of a most interesting character, and altogether of such a nature as has not been found in larger exhibitions we have boasted of under the more comprehensive title of "international."

Interesting exhibits in textiles are found in three different buildings, viz: the main building or machinery hall, the textile hall, and a special exhibit having a house of its own. In the main building, few machines are exhibited, the principle ones of interest being those of sewing machines, but even these are of a more domestic nature than otherwise. L. O. Dielrich, Altenburg, shows three ordinary flat knitting machines of ordinary character, and were, as far as could be seen, the only knitting machines in this department.

Some exhibits of finished goods are very interesting. Alexander Enders, Leipzig, shows a complete range of knitted garments suitable for the nursery. Woolen jackets in special designs, and fine specimens of the adaptability of knitted fabrics for this class of article are shown, while the exhibit of baby shoes is very fine. A. Wäckler, Apolda, also has a case of knitted garments characteristic of the Apolda trade. Some fine examples of warp-loom made shawls are shown, the shell design being above the ordinary, and evidently made upon the latest improved looms, having independent needle action. The many movements necessary to produce some of the designs, show the advantage of the present Jacquard and chain movements for controlling the thread guide bar, over the older system of Dawson wheel. A careful examination of the blending of the various colors used shows at once the great advance Apolda has made, and accounts for the development of this district's trade in British and other markets. One garment in shell design, in white, pink and gold, is a study. Plush woolen shawls, in designs, are exceedingly pretty, as are also children's hoods in close and open work, the silk embroidery trimming being very fine. A child's costume, made from an openwork net fabric in wool, with embroidered design worked on, in colored silks, is neat and attractive. Some fine examples of Vandyke work are shown, and one can but note the great development that has been made in this class of warp fabrics, designs equal to any woven designs in plaids being made on this principle.

Close by, Georg. Köch, of Erfurt, shows a variety of stockings as made upon flat knitting machines, some in ribbed, and others in the plain knitted stitch. Children's goods in flesh, sky blue, light and dark slates and blacks, look very neat. Men's goods are principally shown in black or tan shades with a few mixtures. Theod. Rotta, Apolda, shows a variety of garments, the most attractive being shawls. One of these is particularly interesting, representing a series of perpendicular stripes, each alternate stripe being knitted in imitation of ribbon, while the divisional stripes are in openwork

Vandyke design of light pink. At first glance it appears as stripes of ribbon knitted together by a crotchet work design, whereas the whole was knitted in one piece. A green plush shawl with new icicle borders is a splendid winter design. Caps, ladies' golf cardigans and knitted rugs are included, these latter made in warp looms in heavy stripes and fleeced, are somewhat novel.

The glove industry is represented in the exhibit of Robert Vieweg, Mittelbach. Here, one of the old German wooden frames is shown at work making plain silk glove fabrics. To those who have not seen the "Walenstuhl," this would be interesting, showing the older style of working, the silk yarn being worked from out of boxes supported in the upper part of the framework. In this machine, the principle parts are of wood even to the jacks and sinker bars; the latter and presser arms, facing plates, etc., are nicely inlaid with colored wood and pearls.

An unique exhibit of knitted fabrics is that of Gotthilf Langer, of Koppel. Striped fabrics of most tasteful and somewhat elaborate stripes are most artistically arranged, in some cases the blending of the colors being most effective, the effect of gradation being obtained by the introduction of the various colors in single, two-course and wider stripes. Similar fabrics made up into sporting scarfs, belts, sashes, etc., are shown, and also some fabrics in plaids. Underwear is also shown, the whole exhibit being one blaze of color, but so effectively arranged as to be agreeable to the eye. These fabrics are in striking contrast to a similar exhibit of woven fabrics by Drechsel & Co., of Lichtenstein, and at once show the adaptability of knitted fabrics for design and effect as compared with woven ones.

Herman Friksche, of Burgstadt, shows a case of lace gloves, produced from open and close warp fabrics, the lace work introductions, in some cases, being exceedingly fine.

An interesting and somewhat novel exhibit is that of Edward Nestler, Rosswein, exemplary of the use of knitted fabrics for articles of outer clothing, as coats and trousers, made up from knitted web, some being exceptionally neat and effective. Here are shown gentlemen's bedroom slippers, children and ladies' overgloves, without fingers, made from a felted knitted fabric. Stockings are shown from a similar material, and also girls' house shoes. The latter can be seen largely in use in the German homes, ordinary shoes being seldom worn indoors.

An attractive case in this portion of the exhibition is that of F. B. Eulitz, of Leipzig, showing again the adaptability of warp fabrics for ladies' clothing; some very fine ladies' tight fitting bodices being shown entirely of these fabrics, the borders and sleeves being in design, with plain cloth for other portions. Here, to, is shown a range of the gorgeous striped stockings of the present season design; yellow, gold, red, blues and all other colors are used in combination. Some striking effects are obtained in stockings made on the frame in ordinary stripe work and afterwards having perpendicular chain stitch stripes put on by such chain stitch machines as the Cornelly. Some pretty effects are also produced by mock ribs in design on elaborate striped ground. Sweaters are shown from fabrics in self-ground with square stripes, horizontal lines being produced by ordinary stripe work, the perpendicular lines by plaiting with warp threads. These fabrics are also shown in ladies' jerseys, some having tight fitting body and shaped sleeve with large puffs, trimmed with border lace, as also at the cuffs. Gentlemen's sweaters are shown, made from a brown warp fabric with cuffs and collar added, these being made from blue, green and gold in stripes, the gold stripe being edged with black.

Fleeced stockings in brown color are shown; also gray ribs having a pattern worked on by the stitching on of a cord in green and brown color. Knee caps, chest protectors and many other specialties are shown, but one very attractive exhibit is a bicycle hose, tight fitting and having a row of pearl buttons down the side, making it resemble a gaiter rather than a stocking.

Carl. Julius Nestler, of Rosswein, exhibits gloves. The ordinary knitted gloves are poor specimens, but the fleeced gentlemen's riding gloves are novel. Hose in variety, includes a gray hose with white fleeced, turn-over top, shown as a winter cycling hose. Cardigan jackets, merino pants, etc., are included in making up an exhibit, all produced on flat knitting machines of some type or other.

The foregoing conclude the exhibits of interest to the hosiery trade, to be found in this hall, those of special interest being in another hall called "The Textile Hall." Here machinery is in motion and goods shown in process of manufacture.

Before reaching this, an attractive building engages our attention, bearing the name of Kammgarnspinnerei Stohr, of Leipzig. In this building this firm have in sections examples of their spinning and weaving. A most elaborate and effective exhibit in one bay shows the process of spinning the wool, carded and combed tops and products of the drawing and gilling machines, and the final spinning and doubling processes. The colors seen include several new season's colors, in slate, crushed strawberry, and other tints. In another portion of the hall are shown several looms for the weaving of special plush fabrics. The number of shuttles used for making some of the designs shown, being particularly noticeable. Weaving yarns are the attraction of another bay, while perhaps the most attractive, from a visitor's point of view, are those showing a furnished apartment with all tapestry furniture coverings, table cloths, carpets, etc., produced from the yarns shown. A fine collection of different yarns complete the exhibit, including such yarns as Saxonette, Effect Plush, Phantasie, Crepp, Vigo and Kammgarns, for ladies' knitted goods, and throstle yarns for men's goods. The whole comprise a most instructive and a tractive exhibit. The next to which I shall call attention, and which to us, is the most attractive, are the exhibits in Textile Hall, but this must be left over for another article.

To be continued.

The Knitting Gauge.

Prof. Gustav Willkomm, in Technology of Framework Knitting.

In England (the land of the invention of the stocking frame, by W. Lee, in the year 1589), the gauge or fineness of the frame signifies the number of leads, which, containing two needles, lie in a space of three inches; for instance, a twelve-gauge frame has twelve leads or twenty-four needles in a space of three inches, that is, eight needles per inch, each needle and space being one-eighth of an inch. In France, where the stocking frame, and with it the manner of indicating the fineness of it, was introduced from England, it was, at first at all events, named in the English manner; later on, however, they ceased to use the English inch, and adopted the usual measure of the country, the old Paris inch, and the gauge (la jauge) of a frame in France was the number of leads, each with two needles, contained in a length of three Paris inches. With the metric system, a new foot, of one-third metre, and divided into twelve inches, was introduced into France; the gauge of the frame was then altered to the number of leads contained in three new inches, and at the same time two different nomenclatures were introduced, the coarse and the fine numbering, the syllable gros or fin being added to the number (jauges grosses or jauges fins). This

is the present manner of numbering in France, and the gauge is called gros to indicate the number of two-needle leads in three new French inches, and fin to indicate the number of three-needle leads in the like space. For instance, a frame No. 21 gros has 21 leads or 42 needles to three inches, the needle and space being equal to 3-42=1-14 new French inch, and a frame No. 21 fin has 21 three-needle leads for three inches, *i. e.*, 21 needles per inch; the needle and space measure therefore, 1-21 new French inch. The numbers gros bear the relation to the numbers fin of two to three. Generally the numbers gros are used up to No. 27, and the numbers fin from twenty upwards.

In Germany, where the stocking frame was introduced from France, the gauge is in some parts still numbered as in France (partly in South Germany, and partly in the Saxon principalities), and was at first so numbered everywhere. An alteration, however, was continually taking place, and it is not certain whether it was first made in Germany, or already known and used in France. The two and three needle frames, in which the leads contained either two or three needles each, were numbered in a perfectly distinct manner. The latter were called exactly as the French fin already described; but for the two needle frames there were only eight fixed numbers, 0, 1, 2, up to 7, and each designated a certain quantity of leads, each containing two needles to a length of three Paris inches.

	Leads.		*Needles.*				
No. 0 had	40	of	2	each to	3	Paris in.	
" 1 "	36	"	2	"	3	"	"
" 2 "	32	"	2	"	3	"	"
" 3 "	30	"	2	"	3	"	"
" 4 "	28	"	2	"	3	"	"
" 5 "	26	"	2	"	3	"	"
" 6 "	24	"	2	"	3	"	"
" 7 "	22	"	2	"	3	"	"

Bye-and-bye the German frame-smiths arranged their gauges less and less in the French manner, and used the usual measure of the country, and the Saxon gauges became the following:

	Leads.		*Needles per 3 Saxon inches.*	*Needles per Saxon inch.*
Frame No. 7 had	22	=	44	14.15
" 6 "	24	=	48	16
" 5 "	26	=	52	17.18
" 4 "	28	=	56	18.19
" 3 "	30	=	60	20
" 2 "	32	=	64	21.22
" 1 "	36	=	72	24
" 0 "	40	=	80	26.27

Twenty or thirty years since, the frames were all numbered in this way in central Germany, and they are still to some extent; but this is a very imperfect system, as it is very troublesome to reckon the size of the needles, because the numbers bear no relation to the quantity of leads or needles, and therefore this has to be learned separately. Neither can the English and French method be called very direct, because the size of the needles can only be arrived at after a longer calculation; they are only useful for frame-smiths, inasmuch as they can, at any rate, adjust the size of the single leads by putting a quantity of them together. The necessity of giving the quantity of needles for judging the gauge of a frame, and the work produced, has evidently been felt, but as the unit is so small, it has not been possible always to adhere to it, although it has been kept to, as near as practicable. After this manner in Saxony and the neighboring provinces, the gauge of the frame has been named according to the number of needles per Saxon inch. A Saxon 20-gauge frame has, therefore, 20 needles per Saxon inch. In this manner it is very easy to judge of the gauge of a Saxon frame, as in the above example the needle and space measure 1-20 of a Saxon inch, and it is easy to measure by counting the number per inch, or per 1-2 inch, and doubling the latter. The simplicity of this Saxon numbering has caused it to come into general favor, and it is now in use far and wide. Very few of the old numbers are now to be found, and these are only for coarse gauges; the old numbers compare with the present ones as follows:

A 14 needle frame	=	old No.	7
16 "	"	=	"	6
18 "	"	=	"	5
19 "	"	=	"	4
20 "	"	=	"	3

The old, fine numbers are long since forgotten, and are reckoned according to the number of needles per inch. This Saxon numbering is also more suitable for circular frames than the English and French way. The comparison of these four principal modes of naming the gauge, viz: English, Saxon, French gros and French fin, is very easy to reckon, and is very necessary, as the international trade in stocking frames is now very large. Suppose, for instance, we call a Saxon No., S, then S needles=1 Saxon inch; an English No., E, then E leads=2 E needles=3 English inches; a French No. gros, Fg, then Fg leads=Fg needles=3 new French inches; and a French No. fin, Ff, then Ff leads=2Ff needles +3 ditto.

In order to compare the different units of measurement (inches), it will be better to reduce them to the metric system, therefore

1 Saxon foot=283.19 millimetres (mm) and 1 Saxon inch=23.6 mm.

1 English foot = 304.79 millimetres (mm) and 1 English inch=25.4 mm.

1 French foot=333.33 millimetres (mm) and 1 French inch=27.78 mm.

The relation of the two numbers to each other may be found by rule of three, or by simple equations; for example, take English No. E and Saxon No. S.

S needles=1 Saxon inch.
1 Saxon inch=23.6 mm.
25.4 mm=1 English inch.
3 English inches=E leads.
1 lead=2 needles.

$$S\ 25.4\times 3=23.6\times E\ 2.$$

$$S=\frac{23.6\times 2}{25.4\times 3}E=0.62\ E,\ \text{and therefore}$$

$$E=\frac{1}{0.62}S=1.61\ S.$$

That is, by multiplying the English number by 0.62, we get the Saxon gauge, and multiplying the Saxon number by 1.61 gives the English gauge. For instance, an English 24 gauge is in Saxon=0.62×24=15 needles, and a number 20 Saxon (20 needle frame) is in English=1.61×20=32 gauge.

By very similar calculation the relation of any two numbers to each other may be found. The result of these calculations is given in the following tables:

S.	*E.*	*Fg.*	*Ff.*
	S = 0.62	E = 0.57	Fg = 0.85 Ff.
1.61	S =	E = 0.92	Fg = 1.37 Ff.
1.76	S = 1.09	E =	Fg = 1.5 Ff.
1.18	S = 0.73	E = 0.67	Fg = Ff.

For French circular frames, in which the needles do not lie parallel to each other, this table is not adapted, as it requires to be arranged at what part of the needle's length the measurement is to take place. It is however, suitable for straight-hand and rotary frames, also English circular frames.

A few examples will make this table clear.

1. Suppose we have a Saxon No. 30-needle frame, and want to know the corresponding English and French numbers, the second line gives E=1.61 S = 1.61×30 = No. 48 English; the third line gives Fg=1.76 S=1.76×30= 53 French gros; but as the French numbers gros are not used as high as 53, we turn to the fourth line, Ff=1.18 S=1.18×30=35 to 36 fin French.

2. If a frame is according to French No. 22 gros, it will be a Saxon S=0.57 Fg=0.57×22=12 to 13 needle, and English E=0.92 Fg=0.92×22=20 to 21 gauge.

3. An English 30-gauge frame is in Saxon S=0.62 E=0.62×30=18 to 19 needle, and in French Ff=0.73 E= 0.73×30=22 fin.

4. A frame in French No. 22 fin is in Saxon S=0.85 Ff=0.85×22=18 to 19 needle, and English E=1.37 Ff= 1.37×22=30 gauge.

However easy it may be to calculate these different numbers, a uniform system in every country is manifestly preferable, and it would be very desirable if all those interested, framework

knitters, frame-smiths, and others, would unite and try to achieve this object. The most direct way possible existing, that is the Saxon, is to be preferred, because this gives the gauge of the frame almost immediately. Since the introduction of the metric system in Germany, however, the old Saxon inch is no longer admissible; the question is, therefore, what length should be used? In England, when once the metric system is introduced, they will be in the same difficulty, and they would have already found the same in France if they had not, at the same time as the metre was introduced, adopted a new inch, differing very little from the old one (an old Paris inch was 27.07 mm, and the new one is 27.78 mm), so that the new numbers are hardly distinguishable from the old ones, and the current unit of "one inch" is retained. In Germany, with the metric system, the unit of "one foot" has been abolished, and a new inch has been introduced, but it is exactly a centimetre = 10 mm, and differs considerably from the old inch formerly in use in various German provinces. The latter, which is the same as the Saxon inch used for numbering the stocking frames, exists no longer, therefore a change in the numbering becomes necesssary. Manifestly the new measure to be decided upon must be one to be filled by the needles and spaces corresponding to that of the gauge. It is, therefore, considered unadvisable to adopt the new inch of 10 mm, because it is such a small measure that both for coarse and fine gauges it would at times contain fractions of the needle spaces, and then the real number would not be so easily seen. The gauge of a frame should be always indicated by the number of needles contained in 100 mm. A 50 gauge or 50 needle frame would therefore have 50 needles in a space of 100 mm, each needle and space occupying 2 mm. This length of 100 mm is long enough to be used by framesmiths for adjusting, and also long enough for all gauges to be indicated in whole numbers, and, as the measuring rules are always divided into single millimetres, everyone would have the means at hand of seeing at once the gauge of a frame. For instance, a 100 needle frame would have the needles divided exactly as the millimetre strokes on the rule; in a 50-needle frame they would be 2 mm each, in an 80-needle frame, 1 1-4 mm, and in a 25-needle frame, 4 mm. But if the length should seem too great, and take too much time in calculating the fine gauges, then there would be no harm in taking 25 or 50 mm, and multiplying the result by 4 or 2, in the same way as the revolutions of an axle counted for 15 or 30 seconds give the number per minute.

The following calculation give the relation of the new numbering N to the old Saxon numbers:

N needles = 100 mm.
23.6 mm = 1 inch (Saxon).
1 inch = S needles.

$$N = \frac{100}{23.6\,S} = 4.24\ S, \text{ and}$$

$$S = \frac{23.6\ N}{100} = 0.236\ N.$$

A 100-needle frame, new reckoning, would, therefore, according to the present number, S, equal $0.236 \times 100 =$ 23 to 24; a present 12-needle frame would be new $N = 4.24 \times 12 = 51$.

—A pair of English-knitted silk stockings was presented to Queen Elizabeth, in 1560, by "Mistress Montague," and it is stated that these stockings, which encased the lower extremities of "Good Queen Bess," were the first knitted ones ever worn by an English sovereign, and after this gift the "Virgin Queen" absolutely refused to wear the "cloth hose" which had been the previous fashion. Knitting, which had been confined before this to the humbler and especially rural classes, very soon became a fashionable employment among the ladies of rank and culture. The instruments first used were of the simplest

kind, consisting of two, three, four or more straight needles of bone or wood, and at a later period of steel. These were manipulated by the hands of the operator in the formation of a series of loops or stitches, and the start was made by "casting on," or, as our grandmothers would say, "setting up," the required number of stitches according to the article to be knitted.

Labor in the Saxony Knitting Industries.

Editor Textile World:

There was never lower wages in the knitting industries of Saxony than now. This is shown by the reports of the government's industrial inspector. He reports 8 1-2 to 9 marks as the weekly wages of men who work at home in the mountains ($2 to $2.25). Men in factories make a very little more. In certain cases, reported by the inspector, the help had to furnish not only the oil or petroleum necessary in night work, but the lamps, the manufacturer claiming that this was necessary if he was to hold his own in competition with others. If not this, then lower wages. A similar declaration was made by another manufacturer, who deducted seven cents from his help's weekly wages for light. Yet worthier working men and women are to be found nowhere in the world. They work so willingly, patiently, industriously, that it is a pity they have such small wages. It is a common practice, so the Chemnitz inspector reports, for people working in the mountain mills to pay for the light by which they work. At one time the manufacturers hoped to wipe out this paying-for-oil evil. The inspector reported cases where six cents a week was deducted from each person using the eating and resting room of the concerns; and one factory that took off 1-4 of a cent weekly to pay for broken windows; and a needle factory that took 2 per cent. a week for what is called "Auschuss." All these the inspector condemned and forbade. One must say that no country on earth cares more, in such way as it can, for its workpeople than does this empire. The absence of evidence of poverty, of tramps, vagabonds, rowdies, is really remarkable. If there are idlers and loungers one never sees them. Of course the knitting industry is going through a most remarkable test of its powers to exist. If it pulls through it must do so with diminished strength. It can hold its own no longer against the successful efforts reported from Philadelphia, Fort Wayne and New England.

Terrible as is this picture, its causes are known, and to no one better than to the intelligent manufacturers of this city and section. If tide is down low, almost out, in the knitting industries, it is running high in most other branches. Spinners, weavers and machine builders are running day and night. The last have their books or hands full of orders for the next 12 or 18 months. The empire's energies are anything but exhausted. Her efforts along other lines will more than make up for the losses in hosiery. The United States was long looked on as an uncertain factor in her annual columns, *i. e.*, in hosiery, gloves and underwear. The American domestic are doing so well that even the highest grades here have much to fear. If the past twenty-five years prove anything, they prove that German genius, backed by energy, intelligent effort, economy, etc., will, in the future, as in the past, make for her manufacturers one of the most important places in the world's markets.

C. F. Brown.

Chemnitz, Saxony.

—The electric system affords but another means of transmitting power from the prime mover to the point of its ultimate application. Its function is to replace, to a greater or less degree, mechanical methods of transmission, such as shafting, belting, ropes, gearing.

POWER DEPARTMENT

O. R. YOUNG, M. E., Editor.

Practical Electricity.

LOUIS DENTON BLISS.

ELECTRIC LAMPS.

Two distinct types of lamps are used for producing artificial light by means of electricity, namely: The incandescent and the arc lamp.

The incandescent lamp while known in the laboratory for many years previously, was only made a commercial success through the labors of Edison, who in 1878 succeeded in producing a lamp, which could be used for practical purposes of illumination, consisting of a platinum filament heated white hot in a vacuum chamber of glass.

The great objection to a lamp with a platinum filament was that the margin between the point of incandescence and melting was so small that the lamp was liable to break down at any time. Edison improved upon his original lamp, however, when he discovered that the usual cause of the breaking down of the filament was due to the cracking of the wire, caused by the ebullition of gases residing within the pores of the platinum, but which were liberated when it rose in temperature. It was evident, however, that the platinum lamp would never be a success for reasons above stated, so abandoning this line of work entirely, he started out on another and finally succeeded in bringing out the well known type of perfected Edison incandescent lamp.

The cause of the production of light in an incandescent lamp is simple. One of the well known results attendant upon the passage of an electrical current through a conductor, is the heating of that conductor, due to the fact that it offers some resistance to the passage of the current. If the conductor be of great resistance the increase in temperature will be accordingly great. If the conductor be exposed to the air, when the temperature is raised, the surface will be oxidised on account of the combination of oxygen with the conductor itself. Thus it will be gradually worn away.

If, however, the conductor be mounted in a transparent chamber of glass from which the air has been extracted, the passage of a sufficient current through a refractory conductor will bring it eventually to incandescence and air being absent, and consequently oxygen, no oxidation of the filament can take place so long as the temperature be maintained at such a point that the filament is maintained just white hot without melting, so long will a satisfactory light be obtained. If, instead of a filament of metal, such as platinum, we employ some other substance which will not melt, it will readily be seen that a filament, which will have an indefinite life, may be obtained.

Experimenting with different substances Edison finally found that a strip of paper or fibre of bamboo admirably answered the purpose, if it was subjected to a carbonizing process, previous to being used. Other manufacturers have found silk, and cotton thread, portions of peach stones and many other substances adapted for the same purpose.

The carbonizing process is as follows: The filaments consisting possibly of cotton thread, which having been soaked in a solution of sulphuric acid and water, have been reduced to a pulpy mass, and then thoroughly washed and passed through dies, to insure uniform thickness, are bent into

the proper horse-shoe form, and having been covered with powered plumbago or lamp black to absorb the heat, are placed in a suitable shape air-tight metal box, and subjected to the action of intense heat, but without contact with the air. It is thus impossible for them to consume and they are reduced to a form of charcoal or carbon. The conducting power of the carbon thus formed is increased by the action of the heat, and also by the deposit in the mass of additional carbon, resulting from the decomposition of hydro-carbon gas produced during the process.

The next step in the preparation of the filament is called the "Flashing Process" the object of which is to obtain electrical uniformity of the conductor by the deposition of carbon in the pores, and over the surface of the filament at certain places, where the electrical resistance is comparatively great. The filament to which has been previously attached conducting wires of platinum, is placed in a bath containing a vapor of hydro-carbon liquid called "rhigolene" or in any other liquid the basis of which is carbon. Coal oil is frequently used for this purpose.

The platinum terminals are then connected to an electrical source, and a current, small at first but gradually increasing, is passed through the filament. The parts of the conductor offering the highest resistance are first rendered incandescent and these portions, and practically these only, receive a deposit of carbon, decomposed from the liquid in which the filament is submerged by the action of the intense heat.

As the current increases other portions next in resistance become successively incandescent and receive a deposit of carbon, until at last the filament glows with a uniform brilliancy indicative of its entire surface having received a deposit of the required depth.

This is necessary, because if the resistance of the filament varies at all throughout its length, it could not be successfully employed for incandescent lamps, because when heated by a current of sufficient strength to render the portions of small resistance satisfactorily incandescent, the temperature of the points of high resistance would be such as to lower the life of the lamp, while if only those portions were safely heated, the lamp would not be efficient. It is thus evident that the flashing process is absolutely essential to the successful manufacture of incandescent lamps.

The name "flashing" was applied to this process because of the flash light emitted by the carbon filaments, while they were undergoing treatment. The process involves but little time and the deposition of carbon increases so rapidly that it takes but a few seconds after the current is first admitted before it is raised to full strength, and

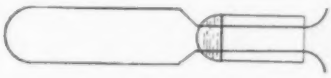


FIG. 1.

the filaments flash with the required brilliancy.

After the filaments are subjected to this process they are mounted in a glass tube (see Fig. 1), which is then welded into the base of the glass bulb, and serves as the vacuum chamber, the bulb having an outlet at its top from which the air may be exhausted. Platinum leading-in wires are essential because this metal is the only known conductor whose coefficient of expansion is the same as that of glass. Were any other substance used, it would either expand or contract more or less rapidly than glass, or by contraction admit air into the chamber. The very principle on which the lamp operates requires that the chamber be heremetically sealed, and oxygen being necessary to combustion the absence of air, and consequently oxygen, prevents the consumption of the filament.

The interior of the bulb is coated with lamp black and the lamp is now subjected to the occluded gas process.

Tubes connecting with the vacuum pumps, are attached to the upper terminal of the bulb, as shown in Fig. 2, and the process of exhaustion commences. In order to insure the complete removal from the lamp chamber of all the air it originally contained, the filament is maintained at incandescence during the process of exhaustion by the passage of the requisite current. This is commenced as soon as the greater portion of the air is exhausted. The lamp black coating the interior walls of the chamber absorbs the heat given out by the filament, and consequently heats the glass itself to a high temperature. This drives off all the air which would otherwise adhere to the walls of the chamber, the lamp black itself being carried off with the air, moisture, and any gases which may be expelled from the surface of the glass. This process is es

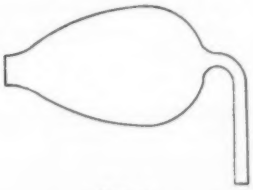


FIG. 2.

sential to the successful sealing of an incandescent lamp.

During the operation a considerable amount of air and other gaseous substances, which have been shut in or occluded by the carbon is driven out. It would be absolutely impossible to get rid of these substances by the ordinary process of pumping. The process of exhaustion must take place simultaneously with the heating, otherwise the air and gases which are thus expelled would be reabsorbed.

The heating of the filament and the exhausting of the chamber, are thus kept up to the moment that the bulb is heremetically sealed, otherwise air might remain in the chamber. The exhaustion of the bulb usually reaches 1-30,000 of an atmosphere, although a vacuum of 1-1,000,000 of an atmosphere is possible. The fraction of an atmosphere, such as 1-30,000 means that fifteen pounds per square inch is being exerted upon the exterior surface of the bulb, and the air is removed from the interior until the pressure exerted from within is only 1-30,000 of fifteen pounds, or 1-30,000 of an atmosphere. It is readily understood that a perfect vacuum is an impossibility.

The necessity of maintaining the filament at a high temperature will be appreciated when it is known that 95% of all the electrical energy expended upon the filament is wasted in heat or in bringing it up to the point of incandescence, only 5% being actually expended in the production of light. Thus were is possible to obtain an electric light without heat, we could obtain 95% more light for the same expenditure of energy.

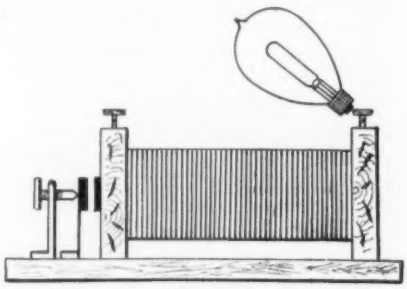


FIG. 3.

The life of the filament in the incandescent lamp is usually about 1,000 hours, although an average life in an installation of from 2000 to 5000 hours is not an infrequent occurence..

The temperature at which an incandescent filament is maintained is usually 1900 degrees when burning at normal candle. An increase in temperature from 1900 to 2000 degrees will raise the candle power forty times, but the life of the filament will be enormously decreased. The real cause of the breaking down of the filament, is that particles of carbon are thrown off during the period of incandescence, which are deposited or precipicated against the walls of the chamber, causing what is known as blackening. This is still further increased by what

is known as "air wash." The small quantity of air in the chamber wears away the filament until it becomes too weak at some particular point to carry the current required to maintain it at candle power, and it breaks in two.

A few years ago what was known as the "stopper lamp" was placed upon the market by the Westinghouse Co., to avoid the Edison patents, which called for an all glass heremetically sealed vacuum chamber, with platinum leading-in wires. The Westinghouse lamp consisted of a glass chamber, but the leading-in wires were not of platinum and as the entrance was simply corked up, the chamber was not heremetically sealed. The bulb was filled with hydrogen gas, after the air had been exhausted, and oxygen being necessary to combustion, the presence of the hydrogen to the exculsion of the air prevented the consumption of the filament. These lamps had an average life of about 200 hours, but on account of many defects their use was soon abandoned.

Incandescent lamps are made in 16, 20, 24, 32, 50 and 100 candle power. About 3½ watts of electrical energy are required per candle power. Any combination of volts and amperes which will produce this wattage may be employed.

It is very important to be able to ascertain whether or not a good vacuum has been produced, because should air exist in the chamber the filament would fail in a few hours instead of burning for 1000 hours. In order that lamps may be guaranteed some test is essential to demonstrate the quality of the vacuum.

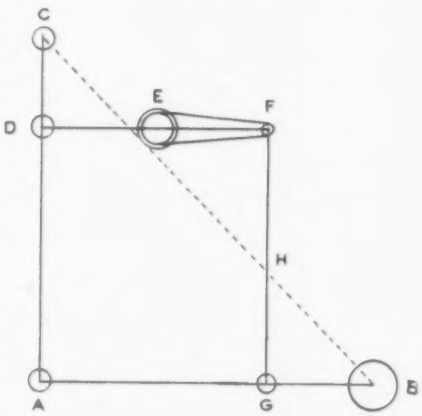
Immediately after lamps are sealed they are sent to a dark room, furnished with a powerful inducting coil connecting with a battery. The secondary winding of this induction coil, is open and the lamp, held in the hand is touched upon one of the secondary terminals, as shown in Fig. 3. The room being dark it is easy to distinguish a phosphorescent glow in the bulb, illuminating its whole interior, but not heating the filament. The effect of a high frequency current of this character passing through a vacuum bulb will always produce this glow, but the peculiarity which determines the quality of the vacuum is that if any preceptible quantity of air is present the glow will be decidedly pinkish in color, while if the vacuum is a good one, the glow will be blue.

Parallel Motion.

W. A. SMITH.

Parallel motion is a combination of bars and rods having for its object the guiding of the piston rod of a steam engine in a constant straight line, or as near a straight line as can be practically obtained.

It is applicable, in different forms, to



any type of engine, but its adaptation to the side lever engine is the more general.

Fig. 1 shows its application to this type of engine. A B, equals half of the length of the side lever vibrating on the centre B; A C is the side rod attached to the cross-head at C; G F is the parallel motion side rod; D F, the parallel bar; and E. F, the radius bar vibrating on the centre E.

The object to be attained is to make the point C. travel vertically in a straight line, or as near so as possible.

From the construction of the figure it will be seen that when the point F

moves to the left, and vice versa, there must be some point (H, in the rod F G) which will move very nearly in a straight line.

If the lengths G B, and E F were equal, that point would be in the centre of F G; but, since they are unequal lengths, H must be in such a position that E F, is to F H, as B G, is to G H.

Now then, having secured the point H, draw the line B C, through H, which will determine C, the centre of the cross-head.

The triangles B H G, and B C A, being similar and joined together in such a manner that no matter how much the angles of the one may alter, the angles of the other must alter to precisely the same extent, it follows that if the apex, H, of the one moves in a straight line, the apex, C, of the other must move in a straight line also.

It matters not where the points D F C, may be situated, so long as D does not coinside with G, and the figure A D F G is a parallelogram. Neither does it matter about the respective lengths of the sides of the parallelogram, so long as E F, is to F H, as B G, is to G H.

In practice it happens sometimes that the parallel motion gets out of adjustment, the piston rod perhaps rubbing hard on the stuffing box at one side at the top of the stroke and hard on the other side at the bottom of the stroke, or it may rub hard on the stuffing box at one end of the stroke and be quite free at the other end. Such a result can be brought about in three ways only: either the sides of the parallelogram A D F G are out of parallel, the radius bar E F of incorrect length from wear of the brasses, or the centre E has by some means been moved from its true position.

These can be all remedied by lining up at the proper places, of course taking care about the centre A, in order not to endanger striking the cylinder head by interposing too much at that point.

Chalk Talks.

JOSEPH H. McNEILL.

SUB-DIVIDING AN INDICATOR CARD.

If an engine carried the maximum initial pressure from the beginning to the end of the stroke, and when that point was reached the steam could be got rid of instantly, if the engine also had no compression, then the indicator would give a rectangular figure, as a diagram. To find the mean effective pressure of this, it would be merely necessary to measure its height at any point, with the scale at which the diagram was taken.

But indicator cards are very irregular figures. The initial pressure being carried but a portion of the stroke, when the steam is used expansively. The exhaust is not instantaneous, and almost all engines have more or less compression.

We therefore take the height of the card at a number of different points and strike an average to get the mean height, or in other words reduce the irregular figure to a regular one, its length being the same as the first, but its height being the mean height. To do this without the aid of a planimeter requires that the card be divided into a number of equal parts usually ten.

To divide an indicator card into ten equal parts and do it accurately, by simply using a pair of spacing dividers is a task, which although a simple one, requires some patience and a steady hand on the part of the engineer.

In this matter however, as in many others, connected with steam engineering, we can bring to our aid devices which are of material assistance, giving correct results and saving valuable time.

One of the most simple methods and one which an engineer can easily make for himself is shown in Fig. 1, its construction being as follows.

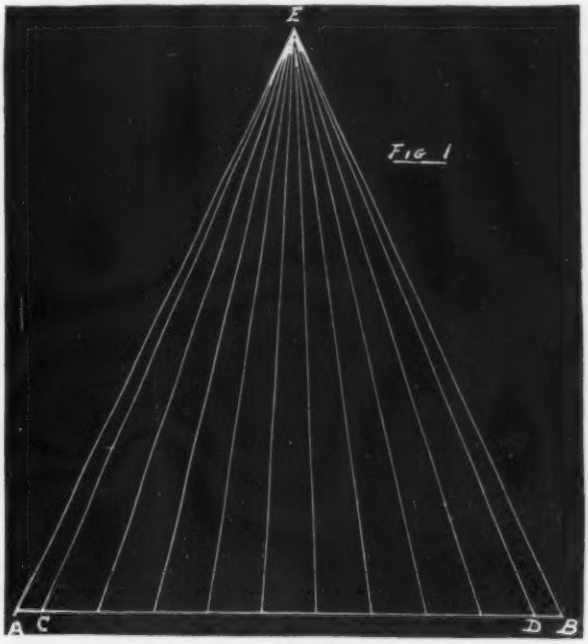
On a piece of transparent tracing cloth draw a line A B, say 6¼ inches

long, although any length will do so long as it is longer than the indicator diagrams to be divided.

Divide the line A B, into eleven parts the two end ones A C, and D B, being each one-half as wide as the others, which should all be equal.

In this case with A B, being 6¼ inches long, A C, and D B, will each be 5-16 inch and the other nine divisions 5-8 inch long.

Take a point E, at a sufficient proportionate height above A B, and join A E, C E, D E, B E, and all the other intersecting points.



SUB-DIVIDING AN INDICATOR CARD.

Wishing to subdivide the indicator diagram shown in Fig. 2, first mark off on the atmospheric line the points K, and L, agreeing with the extreme ends of the card.

Now place the transparent tracing cloth, Fig. 1, over the diagram, having the two outer lines A E, and B E, passing through the points K, and L, and the base line A B, being parallel with the atmospheric line K L of the card.

Measure with the scale at which the card was taken, its height as shown by the dotted lines, at each of the points where the lines on the tracing cloth cut the atmospheric line. Add these together and divide the sum by ten, to find the mean effective pressure.

The tracing cloth can be used any number of times and with any length of indicator card, not exceeding 6¼ inches. This however is longer than the indicator, in ordinary use, will give a card. Five inches being about the maximum.

—Blisters and cracks are liable to occur in the best plate iron. When the first indication appears there must be no delay in having it carefully examined and properly cared for.

—Fusible plugs, when used, must be examined when the boiler is cleaned, and carefully scraped clean on both the water and fire sides, or they are liable not to act.

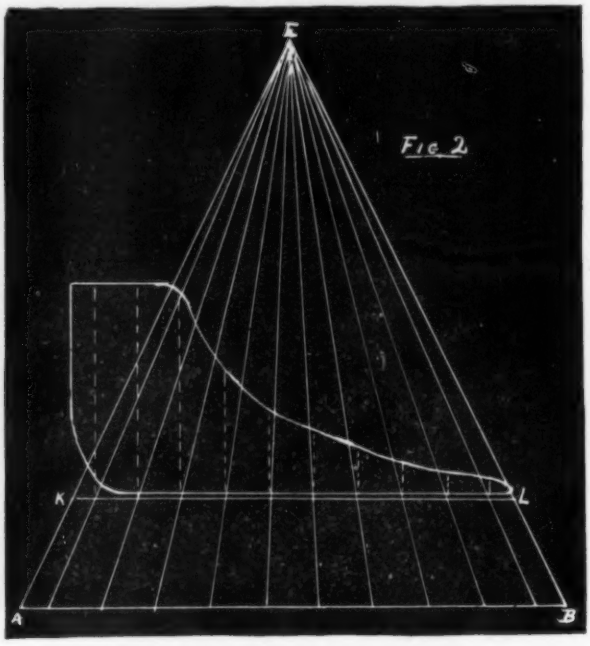
—It should be borne in mind that the electric generator, so called, does not generate, or rather does not originate, the energy which is to be utilized in the driving of the establishments. Power must be applied to it from without. It receives this power in the form of mechanical energy, and transforms it into electrical energy. This is transferred in its new form by means of conducting wires to the motor, where it is retransformed and appears again as rotary motion, to be then applied to driving of the machinery, either directly or through small shafts and belts.—[Paine.

—If the feed water in a boiler is muddy or salt, blow off a portion frequently, according to condition of water. Empty the boiler every week or two, and fill up afresh. When surface blow-cocks are used, they should be often open for a few minutes at a time. Make sure no water is escaping from the blow-off cock when it is supposed to be closed. Blow-off cocks and check valves should be examined every time the boiler is cleaned.

—Never pump cold water into a hot boiler. Many times leaks, and in shell boilers, serious weakness, and sometimes explosions are the result of such an action.

—Examine frequently parts in contact with copper or brass where water is present, for signs of corrosion. If water is salt or acid, some metallic zinc placed in the boiler will usually prevent corrosion, but it will need attention and renewal from time to time.

—In boilers with thick plates or seams exposed to the fire, steam should be raised slowly, and rapid or intense firing avoided. With thin water tubes, however, and adequate water circulation, no damage can come from this cause.



SUBDIVIDING AN INDICATOR CARD. See page 86.

COLORS AND DYEING.

Dye Recipes for August.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 113.

Unbleached Cotton Yarn.

See Recipe 117 showing the bleaching effect, on this yarn, of Peroxide of Sodium, manufactured and sold by The Roessler & Hasslacher Chemical Co., 100 William St., Woodbridge Building, New York.

RECIPE NO. 114.

Drab on Cotton Yarn.

Cross Dye Drab on 100 lbs. cotton yarn.

Prepare dye bath with

1½ lbs. Cross Dye Drab.
(Read Holliday & Sons, 100 Williams St., New York.)
2 lbs. Soda Crystals.
30 lbs. Salt.

Enter in yarn at 140° F., and bring temperature up to boil. Turn one hour at that heat; rinse and dry.

Cross Dye Drab is a new color, and dyers will find it to be an extra fast and cheap one. It dyes drabs all the way from a light pearl down to a dark brownish shade, giving excellent results. It works very level and slowly on the fibre. Cross Dye Drab can be topped with Bichromate of Potash or with Blue Vitriol, which will produce extra fast shades. It can also be topped with basic or direct dyes, making it a most valuable color. (See Recipe 112, in which Cross Dye Black is used for a black on cotton.)

RECIPE NO. 115.

Black on Cotton Yarn.

Chrome Black on 100 lbs. cotton yarn.

Prepare dye bath with

6 lbs. Chrome Black B. B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
30 lbs. Salt.

Enter in yarn at boil, and turn one hour at that heat. Lift out and turn one-half hour at 180° F. in a bath of

1 lb. Bichromate of Potash.
3 lbs. Blue Stone.

Wash.

Chrome Black, like Chromanil Brown, is fast after it is treated with Blue Stone and Chrome; will stand acids and alkali, and will not bleed into the white when washed together.

RECIPE NO. 116.

Dark Blue on Woolen Yarn.

Dark Blue on 100 lbs. woolen yarn.

Prepare dye bath with

2 lbs. Azo Acid Blue B.
1 lb. Azo Acid Black R.
(Victor Koechl & Co., 79 Murray St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Oil of Vitriol.

Enter in yarn at 140° F., bring to boil while turning, and turn to shade at that heat.

Fine dark and brilliant shades of medium and dark blues can be obtained by combining the above two colors, producing a fast color. They combine well together. (See Recipes 48, 59 and 70, in which Azo Acid colors are used for the production of different shades of blues and blacks.)

RECIPE NO. 117.

Bleached Cotton Yarn.

This sample of bleached yarn is from

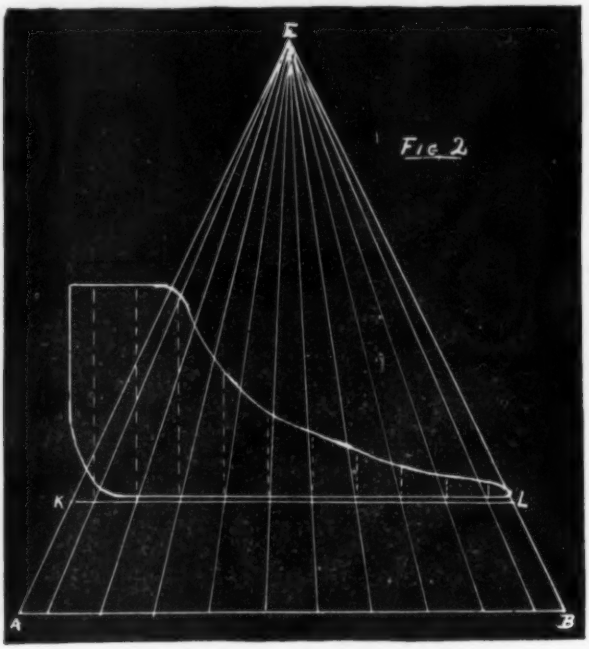
—It should be borne in mind that the electric generator, so called, does not generate, or rather does not originate, the energy which is to be utilized in the driving of the establishments. Power must be applied to it from without. It receives this power in the form of mechanical energy, and transforms it into electrical energy. This is transferred in its new form by means of conducting wires to the motor, where it is retransformed and appears again as rotary motion, to be then applied to driving of the machinery, either directly or through small shafts and belts.—[Paine.

—If the feed water in a boiler is muddy or salt, blow off a portion frequently, according to condition of water. Empty the boiler every week or two, and fill up afresh. When surface blow-cocks are used, they should be often open for a few minutes at a time. Make sure no water is escaping from the blow-off cock when it is supposed to be closed. Blow-off cocks and check valves should be examined every time the boiler is cleaned.

—Never pump cold water into a hot boiler. Many times leaks, and in shell boilers, serious weakness, and sometimes explosions are the result of such an action.

—Examine frequently parts in contact with copper or brass where water is present, for signs of corrosion. If water is salt or acid, some metallic zinc placed in the boiler will usually prevent corrosion, but it will need attention and renewal from time to time.

—In boilers with thick plates or seams exposed to the fire, steam should be raised slowly, and rapid or intense firing avoided. With thin water tubes, however, and adequate water circulation, no damage can come from this cause.



SUB-DIVIDING AN INDICATOR CARD. See page 86.

COLORS AND DYEING.

Dye Recipes for August.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 113.

Unbleached Cotton Yarn.

See Recipe 117 showing the bleaching effect, on this yarn, of Peroxide of Sodium, manufactured and sold by The Roessler & Hasslacher Chemical Co., 100 William St., Woodbridge Building, New York.

RECIPE NO. 114.

Drab on Cotton Yarn.

Cross Dye Drab on 100 lbs. cotton yarn.

Prepare dye bath with

1½ lbs. Cross Dye Drab.
(Read Holliday & Sons, 100 Williams St., New York.)
2 lbs. Soda Crystals.
30 lbs. Salt.

Enter in yarn at 140° F., and bring temperature up to boil. Turn one hour at that heat; rinse and dry.

Cross Dye Drab is a new color, and dyers will find it to be an extra fast and cheap one. It dyes drabs all the way from a light pearl down to a dark brownish shade, giving excellent results. It works very level and slowly on the fibre. Cross Dye Drab can be topped with Bichromate of Potash or with Blue Vitriol, which will produce extra fast shades. It can also be topped with basic or direct dyes, making it a most valuable color. (See Recipe 112, in which Cross Dye Black is used for a black on cotton.)

RECIPE NO. 115.

Black on Cotton Yarn.

Chrome Black on 100 lbs. cotton yarn.

Prepare dye bath with

6 lbs. Chrome Black B. B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
30 lbs. Salt.

Enter in yarn at boil, and turn one hour at that heat. Lift out and turn one-half hour at 180° F. in a bath of

1 lb. Bichromate of Potash.
3 lbs. Blue Stone.

Wash.

Chrome Black, like Chromanil Brown, is fast after it is treated with Blue Stone and Chrome; will stand acids and alkali, and will not bleed into the white when washed together.

RECIPE NO. 116.

Dark Blue on Woolen Yarn.

Dark Blue on 100 lbs. woolen yarn.

Prepare dye bath with

2 lbs. Azo Acid Blue B.
1 lb. Azo Acid Black R.
(Victor Koechl & Co., 79 Murray St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Oil of Vitriol.

Enter in yarn at 140° F., bring to boil while turning, and turn to shade at that heat.

Fine dark and brilliant shades of medium and dark blues can be obtained by combining the above two colors, producing a fast color. They combine well together. (See Recipes 48, 59 and 70, in which Azo Acid colors are used for the production of different shades of blues and blacks.)

RECIPE NO. 117.

Bleached Cotton Yarn.

This sample of bleached yarn is from

the same lot as the unbleached yarn shown in Recipe 113. The bleaching agent is Peroxide of Sodium.

GENERAL RULES FOR BLEACHING COTTON.

Apparatus:

Two clean wooden vats free from metals. Lead pipe to run around bottom, being connected outside of vat with steam or hot water supply pipe, and also exhausting on the outside. Tin scoop for weighing out the Peroxide and sprinkling into vat. Wooden stirrer for mixing the bath. Red and blue litmus paper. Gas measuring tube. Preparatory goods must be as clean as possible.

Proportion of chemicals:

3 lbs. Peroxide neutralizes 4 lbs. Sulphuric Acid 66° Be.
5 lbs. Peroxide neutralizes 8 lbs. Oxalic Acid, Prime.

COTTON.

Bleach bath.

To every 100 gallons of water add:

2 lbs. 5 ozs. Sulphuric Acid, 66° Be. (Oil Vitriol),

then add, constantly stirring,

2 lbs. Peroxide of Sodium,

or so much as to make bath neutral, neither red or blue litmus paper changing color. Then add 2 lbs. silicate of soda, which makes the solution slightly alkaline (turning red litmus paper blue).

Enter goods into *cold* bath, raise temperature to 120-140° F. Bleach at this heat for one to three hours, giving occasional turns.

Finish baths.

Lift, drain into bath, wash in hot water, pass through soap bath, wash again and dry, or pass on for dyeing, the goods being in best possible condition for that purpose.

The bleach bath is exhausted from one-third to one-half; therefore, for the next batch, add one-third or one-half the above quantities of chemicals. Bath may be used five to ten times.

RECIPE NO. 118.

Red on Worsted Yarn.

Acid Grenadine on 100 lbs. worsted yarn.

Prepare bath with

1 lb. Acid Grenadine.
(John J. Keller & Co., 104 Murray St., New York.)
4 lbs. Oil of Vitriol.
15 lbs. Glauber's Salt.

Enter in yarn at 140° F., bring to boil while turning, and turn to shade at that heat.

Acid Grenadine is very well adapted where fast shades are required, as it will stand both fulling and light. It will also combine with other acid dyes, and works slowly and level on the fibre.

RECIPE NO. 119.

Medium Green on Cotton Yarn.

Green on 100 lbs. cotton yarn.

Prepare dye bath with

1¼ lbs. Direct Green Y.
¼ lb. Direct Black K.
(A. Klipstein & Co., 122 Pearl St., New York.)
20 lbs. Common Salt.
1 lb. Sal Soda.

Enter in yarn at boil, and turn one hour at that heat.

The above two colors combine well together for shading. They work slowly and evenly on the fibre and are fast to milling. For dyeing dark greens in one dip the above combination will be found to be a cheap one, as the shade can be altered by using different proportions of the dyes. (See Recipes 17 and 33 for the use of Direct Green Y, alone, for a green on cotton yarn, and Recipes 95 and 104 for the use of Direct Black K, alone, for shades of slate on cotton, and Recipe 68 for Direct Black K on cotton for a black.)

RECIPE NO. 120.

Dark Blue on Cotton Yarn.

Dark Blue on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Benzo Blue B. X.
¾ lb. Direct Deep Black R.
(Farbenfabriken of Elberfeld Co., 77 William St., New York.)
20 lbs. Common Salt.
1 lb. Sal Soda.

Enter in yarn at boil and turn one hour at that heat.

Direct Deep Black R. works well in combination with other direct dyes for

shading, and, in itself, produces a very fine and brilliant fast black, dyed in one operation. (See Recipes 79 and 84 for the use of Benzo Blue B. X., for light and medium blues.)

RECIPE NO. 121.

Light Blue on Cotton Flannel.

Diphenyl Blue on 100 lbs. cotton flannel.

Prepare dye bath with

4 oz. Diphenyl Blue.
(John J. Keller & Co., 104 Murray St., New York.)
8 lbs. Common Salt.
4 oz. Sal Soda.

Enter in yarn at 120° F.; bring to boil while turning, and turn to shade at that heat.

For dyeing light or dark blues, Diphenyl Blue will be found to be well adapted. Besides being a fast color, it does not snap on the yarn or cloth, but works slowly and evenly. The color comes in powder form and is very soluble. (See recipes 74 and 87.)

RECIPE NO. 122.

Pink on Cotton Yarn.

Rhodamine Pink on 100 lbs. cotton yarn.

Mordant with

2½ lbs. Tannic Acid.
1¼ lbs. Tartar Emetic.

Wash off and dye in a bath of

1¼ lbs. Rhodamine 5G.
(C. Bischoff & Co., 87 Park Place New York.)

Enter in yarn at 100° F.; bring temperature up to 140°, while turning, and turn to shade at that heat.

Rhodamine 5G. will produce fine shades of rose color, when dyed with 1 1-2 to 2 per cent. of color. Shades dyed with this color will be found to be very fast to sunlight. (See Recipes 73 and 82 for shades of pink on cotton yarn.)

RECIPE NO. 123.

Dark Blue on Mixed Flannel.

Blue 77 G on 100 lbs. mixed cotton and wool cloth.

Prepare dye bath with

5 lbs. Blue 77 G.
(Anchor Color Mfg. Co., 462 Cherry St., New York.)
30 lbs. Glauber's Salt
5 lbs. Borax.

Enter in cloth at 120° F.; run 20 minutes, then bring to boil. Run one hour at that heat, then shut off steam and run 20 minutes longer. Lift and rinse.

In the above shade of blue it will be noticed that both cotton and wool are dyed alike in shade. Blue 77 G. is very well adapted for dyeing such goods; and the dyer will find it a cheap way to dye union goods. For second and future kettles, use one-third less color. (See Recipe 107.)

RECIPE NO. 124.

Dark Green on Worsted Yarn.

Dark Green on 100 lbs. worsted yarn.

Mordant for 1 1-2 hours at boil with

3 lbs. Bichromate of Potash.
2 lbs. Tartar.

Wash and dye with

2 lbs. Logwood Extract N.
10 lbs. Fustic Liquor L.
(Stamford Mfg. Co., 133 Front St., New York.)
2 lbs. Alizarine Violet Paste.
2 lbs. Acetic Acid.

Enter in yarn at 140° F.; bring to boil while turning, and turn to shade at that heat.

The above three colors combine well together, and the shade produced is fast to all mill tests. Fustic Liquor L. and Logwood Extract N. combine well with Alizarine colors, in making fast shades. (See Recipes 71 and 72 for dark plum and dark green; also Recipes 34, 60 and 100 for products of these colors.)

RECIPE NO. 125.

Old Rose on Cotton Yarn.

Direct Brown on 100 lbs. cotton yarn.

Prepare dye bath with

¾ lb. Direct Brown S. D. P.
(Sykes & Street, 85 Water Street, New York.)
15 lbs. Carbonate of Soda.
15 lbs. Common Salt.

Enter in yarn at 110° F., bring up temperature to 205°, while turning, and turn one hour at that heat. Rinse and dry. 40 per cent. color is used on future or standing baths with 5 per cent.

Carbonate of Soda and 10 per cent. Common Salt.

RECIPE No. 126.

Dark Blue on Cotton Yarn.

Dark Blue on 100 lbs. cotton yarn.

Prepare dye bath with

3 lbs. Diamine Blue B. G.
(Wm. J. Matheson & Co., Ltd., 178 Front St., New York.)
20 lbs. Glauber's Salt.
2 lbs. Soda.

Enter in yarn at boil and turn one hour at that heat.

Diamine Blue B. G. is a new color, and is bound to become as popular as other Diamine Blues. It is an easy color to work, and dyes very level and slowly on the fibre. (See Recipe 98 for a light blue.)

RECIPE No. 127.

Bright Red on Worsted Yarn.

Anthracene Scarlet on 100 lbs. worsted yarn.

Prepare dye bath with

2 lbs. Anthracene Scarlet 6 R.
(The Hanna Schoellkopf Co., Philadelphia.)
10 lbs. Glauber's Salt.
2 lbs. Acetic Acid.

Enter in yarn at 60° F.; bring to boil while turning, and turn to shade at that heat.

A fast shade and a bright one is shown, dyed with this color. This house has a number of this class of colors, and the dyer will be able to pro duce any shade wanted by combining them. (See Recipes 77, 89, 90 and 103.)

RECIPE No. 128.

Black on Worsted Yarn.

Black on 100 lbs. worsted yarn.

Prepare dye bath with

5 lbs. Acid Black B. No. 4.
(Anchor Color Mfg. Co., 462 Cherry St., New York.
10 lbs. Glauber's Salt.
5 lbs. Oil of Vitriol,

Enter in yarn at 130° F., bring to boil while turning, and turn one hour at that heat.

Acid Black B. No. 4 comes in the form of a dark brownish powder, and is well adapted for dyeing a fast and clean black on wool. It can be used by dyers of wool or fur hats, on account of its fastness and power of penetrating the felt. It will combine with other acid dyes for shading.

New Dyes.

We call the attention of our readers to the dyeing recipes that appear in this issue, and especially to those in which appear dyes that have not been before used by us this year.

In Recipe No. 114 appears a drab on cotton, produced by the use of Cross Dye Drab, furnished by Read Holliday & Sons, New York. This new coloring matter dyes cotton direct without the aid of a mordant. The shades obtained are exceedingly fast to acids, alkalies, and to light. As indicated by its name, it is specially recommended to stand cross dyeing. A dye bath is prepared with the necessary quantity of coloring matter, 2 1-2 to 5 per cent. of soda crystals and 30 to 100 per cent. of common salt. The cotton is worked whilst the temperature of the bath is gradually raised to the boil and boiled for half an hour. It is then rinsed well and dried. The bath is not exhausted and is kept for further lots; less color, soda and salt being then required to produce the same shade. The shades may be modified by working the dyed cotton in fresh baths containing metallic salts, such as potassium, bichromate or copper sulphate; or they may be topped with either basic or direct cotton colors.

We had the pleasure of showing in our July issue a very handsome bleach on wool, by the use of Peroxide of Sodium, furnished by the Roessler & Hasslacher Chemical Co., New York. We take equal pleasure in showing in this month's issue a sample of cotton yarn bleached by the same agent. In Recipe No. 113, a sample of the yarn unbleached is shown, and in Recipe

No. 117 is seen a sample of the yarn bleached.

In Recipe No. 116, appears a dye furnished by Victor Koechl & Co., New York, known as Azo Acid Black R, in connection with Azo Acid Blue B, for the production of a dark blue on woolen yarn. Azo Acid Black R is another brand of the Azo Acid Blacks dealt in by this concern. In our Recipe No. 48 we show an excellent black on wool, produced by the combination of the brands B and G. We would refer dyers to this recipe for comparison. All of these Azo Acid Blacks dye level, and all shades produced appear full and deep and have a pure blue reflection.

We present a very handsome red color on worsted yarn in Recipe No. 118, produced by the use of Acid Grenadine, furnished by John J. Keller & Co., New York. The color goes on slowly and evenly at boil, and the shades are fast to fulling and light. An additional mark of this dye has just been introduced by this company, of a bluer shade than the one mentioned in the recipe, but having equal properties.

We have in Recipe No. 119, an attractive medium green on cotton yarn, produced by the use of Direct Green Y in combination with Direct Black K, furnished by A. Klipstein & Co., New York. We refer to our dyer's remarks concerning this combination. Direct Green Y is used in coloring wool, cotton or silk in one bath, by the use of Glauber's salt. On wool it is fast to full ng and light. In printing, it may be used with or without albumen.

Direct Deep Black R, furnished by Farbenfabriken of Elberfeld Co., New York, appears in Recipe No. 120, in combination with Benzo Blue BX, for the production of a dark blue on cotton yarn. Direct Deep Black R has been before manufacturers for the last two years, and has been favorably received, and found to be, we believe, an economical material. This dye is fast to washing, and withstands the actions of alkalies, perspiration and ironing, very well. It is suitable for one-half wool fabrics, but when used in this connection it will be found advantageous to top with sulphon colors. It can be padded on cotton cloth and discharged with tin and also with zinc dust.

In Recipe No. 124, a new combination will be noticed, of Logwood Extract N and Fustic Liquor L, furnished by the Stamford Mfg. Co., New York, for the production of a dark green on worsted yarn. We think that dyers will find this combination an interesting one.

An old rose shade on cotton yarn, produced by the use of Direct Brown SDP, furnished by Sykes & Street, New York, will be found in Recipe No. 125. This dye colors cotton in one bath with carbonate of soda and common salt. Very level shades are obtained by passing the cotton, after dyeing, through a slightly acidulated bath of sulphuric acid, say one pound of the acid to 100 pounds water. Increased fastness to light and soap may be had by fixing, after dyeing, with a bath of 3 per cent. each of bichromate of potash, sulphate of copper and sulphuric acid, at 95° F. Without fixing, the product is quite fast to light, air and soap.

Recipe No. 127 shows a handsome, bright red on worsted yarn, produced by the use of Anthracene Scarlet 6 R, furnished by the Hanna-Schoellkopf Co., Philadelphia. This dye produces a fast shade. We refer to our dyer's comments.

A handsome black on worsted yarn is seen in Recipe No. 128, produced by Acid Black B No. 4, furnished by the Anchor Color Mfg. Co., New York. This dye produces a clean color on wool as referred to by our dyer in his comments.

Roundabout Notes.

Knecht proposes the salts of tungsten and molybdenum as wool mordants. There are two commercial salts available, tungstate of soda and molybdate of ammonia, and neither of them are,

so far as price goes, out of the reach of the dyer. Kalle has patented a process for using tungstate of soda for cotton, but its use as a wool mordant does not seem to have been thought of.

***

In Knecht's experiments the wool was boiled for an hour with 3 per cent. tungstate of soda alone and also with 3 per cent. tungstate of soda and 1 per cent. sulphuric acid, after which it was well washed. The wool thus acquires a yellowish tinge. It was then dyed under the usual conditions with the following coloring matters: logwood, fustic, coerulein, alizarin, alizarin brown and gallocyanine. Full colors are thus obtained, the shades of which may be said to lie between those obtained on stannous mordant and on chrome mordant, better results being obtained with sulphuric acid than without. But their fastness to light and to soap can scarcely be said to be entirely satisfactory.

***

With molybdenum, exactly the same mode of procedure was employed as for tungsten, and the tungstate being replaced by molybdate of ammonia. With molybdate alone the color of the wool was not materially changed, but when molybdate and sulphuric acid were used, the wool was colored dull blue.

In dyeing with the same colors as used for tungsten, shades were obtained which resemble closely those obtained with bichromate of potash. Their fastness to light and soap is considerably greater than that of the shades produced with tungstate, and can be considered satisfactory. The best result was obtained with gallocyanine, with which dyestuff a better and fuller shade was produced than on a chrome mordant.

***

Werner proposes a new method of dyeing and finishing mercerised cotton yarn so as to give it the appearance and handle of silk. Such yarn can compete with chappe-silk, especially as the characteristic crackling feel of the latter can be imitated. This can be done by treatment with acetic or tartaric acid, or better with calcium acetate, soap and acetic acid. The process is as follows: (1) Treatment with calcium acetate (5 to 6 degrees Be.) for fifteen minutes at 104 degrees F. (2) Treatment without rinsing out the calcium acetate with Marseilles soap (40 to 60 per cent.) for fifteen minutes at 122 to 140 degrees F. (3) Treatment in the cold with acetic acid mixed with 9 parts of water. Finally dry without rinsing. These processes usually follow the dyeing of the yarn, and may cause some alteration of dark tints. In that case a second visit to the dyebath becomes necessary. For dark colors ordinary pyrolignates of lime may be used, but pure acetate is needed for medium and light shades.

***

Two French chemists patent, in their own country, a process of piece dyeing which is worth describing if only as a curiosity. Any ordinary coloring matter is dissolved in acetic acid, to which a little acetone has been added. The piece to be dyed is then passed into this bath and out through two India rubber rollers. These make the dye liquor penetrate the stuff and squeeze the excess back into the bath. Nothing remains but to dry the piece on the tins or in any other way. The proportions are 15 parts by measure of acetic acid to 5 parts of acetone. The coloring matter is first dissolved in the acetone and then poured into the bath of acetic acid.

***

A French color firm brings out a new process for dyeing wool, whether in slubbing, yarn or piece, in a single bath. The bath is first made up of 2 per cent. of bichromate, 3 1-2 per cent. of technical lactic acid (70 per cent.) and 1 per cent. of sulphuric acid. After entering the wool the bath

is exhausted in about an hour, and then is made up again with any chrome color desired, and the dyeing takes place. It is hard to see where sufficient novelty comes in to warrant a patent being granted.

* * *

Cotton seed oil contains a coloring matter which hitherto has been wasted. It is proposed to recover it in the following way: The alkaline solutions used in purifying oil which contains the coloring matter and impurities are treated by fractional precipitation with any salts that will form insoluble soaps with the fat acids still left in the alkaline liquor. The resinous material and the fat acids thus being eliminated, the residual liquor is treated with hydrochloric or sulphuric acid, or any acid that will combine with the alkali or decompose the alkaline carbonate, and thus precipitate the coloring matter. The coloring matter is then collected in the form of a flocculent precipitate, and preferably used as a paste.

Memoranda and Remarks Regarding Bleaching and Finishing.

BY AN ENGLISH BLEACHER.

(Continued from May.)

A series of articles on this subject was commenced in the May number of this magazine, where great caution was urged upon the finisher and stiffener of calicos, in order that regularity and uniformity might be obtained. It was there stated that the mangle best adapted for stiffening tin finish is a common two-bowl mangle with revolving levers, both bowls to be of wood. Shirtings, mediums and stouts can be done on this mangle after being stiffened. The writer then goes on with his subject as follows:

For very low mangle finish.—For cloth that requires drying and calendering before stiffening, have the mangle as follows: bottom bowl wood, 24 in. diam., top bowl brass 12 to 14 inch, well frictioned and a doctor on the top bowl to keep the face quite clear, and if the stiffening be well made and properly boiled the above mangle will stiffen and fill the very lowest cloth. In stiffening low shirtings that require heavy starch, never let the cloth batch on the top bowl or the face will become very muddy and dirty. Either turn the batch by hand or affix a square on roller spike with a thong or catch on a pulley to be fixed on the end of the bowl centre and drawn with a strap, that the stiffening side of cloth does not adhere to the face and thus you will always keep a bright clear face if not turned too tight. The levers to all stiffening mangles will be found to answer the best if they have loose resolving levers and not a dead set on any mangle. In the first place the wood bowls last much longer and are more durable. They neither require turning up so often nor are they so much crushed, neither are they so apt to get loose on the centre. Also if the levers are loose it is shown at once what weight you have on the bowls, and by measuring the length of your levers can soon calculate what the weight really is. It is impossible to keep or calculate a dead set exactly or so keep a memorandum as a guide and register as to what weight is used for such and such a regular cloth. Again, if it so happens that your starch is too strong it is easily remedied by adding another 28 or 56 lbs on the levers as you may think proper, that is, providing you are putting too much filling in; or the reverse, by taking 28 or 56 lbs off. Or suppose the cloth the mixture is made for, is finished and you have either all inferior cloth or a better cloth to finish. If the difference is only 1 1-2 or even 2 lbs. it will save the trouble or expense of making another mixing by adding to or taking from the levers one or two weights. Therefore the utility of loose levers is at once seen, more particularly for stouts and mediums, but it is advantageous for other cloths as well.

RECEIPTS.

For Low Madapolians: Mangle, dried on tins, damped and slightly calendered.

2½ Flour 22T.
1 Farina.
1 Rice 28T.
2½ Mineral heavy.
3 Clay "
½ Water.

The above mixture will be found to fill the lowest cloth if mangled and dried, and stiffened on a mangle already alluded to.

3rd Finish.—Mangled exactly as mediums and stouts mentioned above.
Mixture.

7½ Cansful Water.
½ Canful Mineralized, well stirred up, and add
1 Canful Farina 24T.

Blue according to shade required, the whole to be sieved and stirred up into boiling tub and boiled, adding grease and soap accordingly. No. 5, 6-56. The goods stiffened with the above are to be dried in stove and canroied.

4th or Tin Finish.—New 150s, shirtings. 39 in 550. 9.8 Run as low tin finish. Stiffened, No. 3 Mangle, 3-56.
Mixture.

2 Cansful Clay heavy.
2 " Mineral.
1 Canful " calcined.
2 Cansful Salt.
Small 2½ " Grease.
" 1 Canful Soap.
2 Cansful Water.
2 " Flour 18 T.
1 Canful Rice "
Small 1 " Starch pure.
" 1 " Farina.

The above is for the lowest tin finish, twice mangled on a 6-bowl mangle.

Tin Finish.—Old 150s, shirtings, 50 yds., 10 lbs. 8 ozs.
Mixture.

1 can Clay
1½ " Mineral
1 " Salt, small
1½ " Grease, small
1 " Soap, "
1 " Flour 18 T.
1 " Rice 18 T.
1 " Starch

Tin Finish. — No. 45s, 36 inches, mediums. Run straight through No. 17 Mangle, 5-56. Stiffened, No. 5 Mangle, 56, lapping top bowl, through 9 mangle.
Mixture.

1 can Clay
1½ " Mineral
3 " Salt Water
1 " Flour 18 T.
6 quarts 1 " Grease, small
1 " Soap
1 " Clear Starch

No. 50, 36 inches, medium, 53 yards, same as the 45s, exact, and run once round full weight.

Tin Finish.—P. T. 36 inches, medium, 53 yds., 13 lbs. 5 ozs. Run once around No. 7 Mangle. Stiffening at No. 5 Mangle, lapping top bowl 4-56, 2 wood, run through No. 9 Mangle. Steam in and lapping top bowl.
Mixture.

1 can Clay
1 " Mineral
½ " Mineral Cal'd
2 " Salt Water
1 " Grease, small
1 " Soap
1 " Clear Starch

No. 30, 36 inches, mediums, 73 yds., 17 lbs. 2 ozs., same as the above with 3-56, on No. 5 Mangle, only one canful more water.

To be continued.

—The textile arts developed slowly for many ages, and somewhat unequally in the attainment of the capacity to produce articles of quality and in quantity. In the former, very high excellence was reached; in the latter, little progress was made until the beginning of the industrial revolution inaugurated by Kaye, Hargreaves, Arkwright, Crompton and Cartwright during the last century, all of whom began their inventions in connection with the cotton trade. With these must be included Watt, the engineer. These men were the fathers of our modern mechanical industries.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Silk Braid.

Editor Textile World:

Will you kindly put us in communication with some concern manufacturing pure silk braid similar to enclosed sample, and oblige

Wisconsin. "Knit to Fit."

We have sent you by mail the addresses of several concerns to whom we would suggest you write. Our Buyers' Index will give you a guide as well.

Cotton Acreage.

Editor Textile World:

Can you give me the cotton acreage for 1897?

Massachusetts. W. H. P.

The cotton acreage, according to the New York Financial Chronicle for 1897, is 22,056,792, against 20,842,545, showing an increase of 5.83 per cent. Latham, Alexander & Co. addressed some 3500 letters to responsible planters, cotton commission merchants, cotton brokers and bankers, embracing every cotton growing county in the South, for the purpose of ascertaining their opinions concerning the acreage, and the average of the estimates was 23,320,000 acres.

Duty on Machinery.

Editor Textile World:

What is the duty on new machinery from Saxony, Germany? Is there any duty on second hand machinery, and if so, what?

Massachusetts. W. W. T. W.

The duty on new and second hand machinery is the same. Under the 1894 Act it was 35 per cent. ad valorem. Under the new tariff law it is 45 per cent. ad valorem.

Cotton Spindles in Europe.

Editor Textile World:

Will you please give us the number of cotton spindles in Great Britain, and in each of the countries on the Continent?

Boston. U. W. C.

Ellison & Co., in their annual report for 1895-96, give the number of spindles as follows: Great Britain, 44,900,000; Continent, 29,350,000. The number of spindles on the Continent are distributed as follows, the statistics being taken from Ellison's Report for 1893, 1894, 1895 and 1896, and the United States Consul reports. In some instances there are exhibited discrepancies between the authorities referred to, but we give preference to Ellison's estimates. For instance, Ellison gives the number of spindles in Saxony, for 1896, at 300,000, while the United States Consul reports place the number at 1,331,427. Russia, 5,800,000; Sweden, 370,000; Saxony, 300,000; Baden, 410,000; Bohemia, 1,600,000; Belgium, 900,000; Switzerland, 1,700,000; France, 4,750,000; Italy, 1,500,000; Prussia, 1,344,250; Alsace, Lorraine, 1,400,000; Bavaria, 1,165,636; Wurtemberg, 435,885; Spain, 2,600,000; Austria (provinces not specified above), 1,400,000; Germany (provinces not specified above), 1,200,000; elsewhere in Europe, and to cover increase since the last census of the spindles, 1,874,229.

A Curious Want.

Editor Textile World:

Is there a loom, an improvement on the old hand-loom, which is run by a crank and to which horse power, or any other power, may be applied? Is there a spinning jenny that is run on the same plan? If so, where can they be obtained? Could not spindles and looms sufficient to manufacture a rough cloth be attached to the cotton gin and run succesfully by the same power that is required to operate the gin? If so, where can they be obtained, and at what cost?

Texas. R. L. B.

We give place to the above inquiry more for its curiosity than anything else. We give the questions exactly as we received them. We are somewhat curious to know what the writer's plan is, or to what use he expects to put the information, which we confess we can scarcely furnish. We will say, however, that we know of no loom that will answer his requirements, as we understand them. Possibly one could be built for him to which power might be applied. If a spinning machine is wanted for coarse numbers, we know of none better than the ring frame. Of course, it is possible to run all of the machinery referred to from the same power that operates the cotton gin. Perhaps it would be well for our corres-

pondent to write to some of our advertisers. We should advise him to consult our advertising pages.

This inquiry suggests reference to a loom that is somewhat novel in its features, recently described in the Indian Textile Journal, Bombay. The loom is said to be very ingeniously constructed, and intended to replace the old fashioned hand loom so largely used in India. The loom is illustrated by our contemporary, showing that it is operated by foot treadles in the same manner as a bicycle; but, on the whole, is constructed in the same way and on similar principles as the modern power loom, being automatic in all of its motions. It is said to be very simple to manage, and in the hands of a person accustomed to the treadles, a speed of one hundred and eighty picks per minute can easily be obtained. The loom is supplied with a positive setting-up motion, by which cloth, from muslin to heavy flannel, can be woven with evenness, and without the use of change wheels. Cotton, silk, linen and wool fabrics can be woven with remarkable ease and accuracy. The loom is arranged to weave with two, three, four, five or six harnesses, and the weave can be readily changed to any required design. It can also be supplied with fixings for weaving from two separate warp beams, if required. Where home-spun yarns are used, suitable warping, beaming and winding machines are supplied. The substitution of leg for arm power is done because the leg muscles are much stronger than those of the arm. The machine is made at Keighley, England.

Chain Dyeing.—Cotton Culture.

Editor Textile World:

I should like to obtain a set of specifications and drawings of the patents issued to one, Gildard, who took out patents for a system of chain dyeing. The patents were issued some years ago, and I am unable to find their numbers or dates of issue.

Will you kindly let me know of the title of some books on cotton culture?

New York. V. P. P.

In regard to the letters patent, we refer our correspondent to the Commissioner of Patents, Washington, D. C. He will furnish the information, if it can be obtained.

In regard to books, or other information on cotton culture, we refer to the following authorities: "Cotton Plant," recently issued as Bulletin No. 33, of the Experimental Stations, published under the authority of the Department of Agriculture, Washington; price, 60 cents, 434 pages. Eleventh Census of the United States—volume on agriculture. Tenth Census of the United States, volumes V. and VI. Annual reports of the Secretary of Agriculture, Washington, with special reference to the following annuals: 1862, 1864, 1866, 1867, 1868, 1870, 1871, 1873, 1876. "Cotton Facts," by A. B. Shepperson, Cotton Exchange Building, New York. "Cotton from Seed to Loom," published by Wm. B. Dana & Co., New York, 1878; 291 pages.

Our Dyeing Recipes.

Editor Textile World:

In one of your recent recipes, I noticed one, No. 31, for fast black on cotton yarn. I should like to know if that recipe is for 100 pounds of yarn, or less; also the quantity of water necessary for the dyebath, and if the color (Fast Diphenyl Black), with Glauber's salt and sal soda, must be put into the water all at the same time, or one after the other, and if these substances must be dissolved in boiling, tepid or cold water.

New York. F. P.

We always refer, in our recipes, to 100 pounds of the material that is to be colored. As for the amount of water to be used, the dyer must use his own judgment. The material to be dyed will have to have enough water to be worked freely. In regard to the particular recipe referred to, the sal soda is first put into the bath in a small quantity of water, and boiled; then the salt added; and lastly, the dye. The bath is boiled, then filled up with cold water and boiled again, when the goods are entered, and worked as stated in the recipe.

Egyptian Cotton Seed.

Editor Textile World:

Has there been any Egyptian cotton seeds distributed among the Southern planters by the United States authorities?

Texas. X.

We know of no distribution of this kind within recent years, or within the last fifteen years, except in 1892-93, and in 1893-94, two varieties of Egyptian cotton seed were distributed by the U. S. Department of Agriculture. The varieties thus distributed were known as "Afifi" and "Bamia," procured from A. Planta & Co., Alexandria, Egypt. During 1896 some Egyptian cotton seed was distributed among Southern planters, particulars of which we are not familiar with.

Compressed Air.—Edward Atkinson's Works.

Editor Textile World:

Will you please forward me the address of parties applying the compressed air system described in your isue of June; also please send me a list of the works of the Hon. Edward Atkinson.

New York. J. H.

The parties referred to in the article on "Compressed Air," are the Ingersoll-Sergeant Drill Co., Havemeyer Building, 26 Cortlandt St., New York. There is no published list of Mr. Atkinson's works. We will enumerate the following, however: "The Distribution of Products"; "The Margin of Profits"; "The Industrial Progress of the Nation"; "Taxation and Work"; all published by G. P. Putnam's Sons, New York; also "The Science of Nutrition," published by Damrell & Upham, Boston.

Cotton Deliveries.

Editor Textile World:

Is the round, or cylindrical, bale a good delivery on a future contract? What is understood by a mixed or falsely packed bale? What is the weight of a merchantable cotton bale?

Connecticut. G. S.

The round, or cylindrical, bale is not recognized as a good delivery on a future contract, according to the rules of the New York Cotton Exchange. The only form of a cotton bale for a delivery of this kind is a square one, of a weight not less than 300 pounds. Any weight under this is unmerchantable. As our correspondent knows, probably, the cotton must be of a growth of the United States. A mixed, or false-packed bale, is one that contains foreign substances, or one that is water packed, or contains damaged cotton in the interior, without any indication of such damage on the exterior of the bale; also such as are plated or composed of good cotton upon the exterior, and decidedly inferior cotton in the interior of the bale, so situated as not to be detected without opening or boring the bale. Of course, such a bale is unmerchantable. We might add that the mixed packed bale is graded according to the grade of the poorest quality in the bale.

Tape.

Editor Textile World:

Can you put me in communication with parties of whom I can obtain tape like the enclosed sample?

Georgia. O. H. S.

The sample referred to is an inferior manufacture of linen warp and cotton filling. We have sent to our correspondent the name of a party of whom he can obtain the article.

Elastic Cord.

Editor Textile World:

Can you inform us where we can obtain some silk elastic cord like the sample enclosed?

New York. S. B.

We should advise our correspondent to write to George S. Colton, Easthampton, Mass., who makes a specialty of this manufacture, including suspenders, garter webs, etc.

Labels.—Pearl Buttons.

Editor Textile World:

Will you send us the address of a concern manufacturing woven labels; also one manufacturing smoked pearl buttons of a high grade. The ordinary manufacturer does not give much attention to smoked goods.

Wisconsin. P. U. C.

For the labels, we would suggest writing to B. Richardson, Sec'y, Silk Associa- of America, 445 Broome St., N. Y., for names of manufacturers. In regard to pearl buttons, we do not think that our correspondent can get the grade, as high as he would like, made in this country. We think he will have to depend upon the imported article, and would refer him to the following parties: Rothchild Bros., Broadway, New York; B. Blumenthal & Co., Broadway, New York.

Flax.

Editor Textile World:

Will you kindly give me the names of the linen mills in the United States? What are the import duties on flax?

Denver, Colo. J. M.

We refer our correspondent to the Textile World's Directory, which gives the names of all the linen mills in this country. In regard to the import duties on flax, we will say that the recently enacted tariff act imposes the following duties: Flax straw, $5 per ton; flax not hackled or dressed, 1 cent per pound; flax hackled, known as "dressed line," 3 cents per pound; tow of flax, $20 per ton.

Where is the American Bradford?

Editor Textile World:

Kindly send me copy of current issue of Textile World. Can you tell me if there is any publication which gives a list of the cloth manufacturers in the United States, with the number of looms and the class of goods made by each firm. Will you also please tell me which is the principal town for the manufacture of worsted coatings, suitings and trouserings, such as are made here in Huddersfield and Bradford?

Halifax, Yorkshire, England. T. L.

Concerning your inquiry about publication giving list of cloth manufacturers, would say that the Textile World's Directory of the Trade gives just such information. This directory is sent to subscribers to the Textile World without extra charge.

In the United States, the different branches of cloth manufacture are not so centred as they are in England, and there is no city or town devoted exclusively or principally to the manufacture of worsted coatings, suitings, etc. There are probably more mills of this character in the vicinity of Providence, R. I., than elsewhere, and we would also name Philadelphia, Pa., and especially Rockville, Ct., as localities where there are many such establishments.

New Publications.

BROCK'S MILL REPORTS for May, 1897. We have just received a late issue of these reports on woolen, cotton, silk, carpet, flax, jute and wool hat manufacturers, and cotton and wool dealers of the United States and Canada. Every holder of this book is entitled to a telegraphic code. The work will be replaced by a later edition sometme during this summer. It is claimed that not one mill in nine hundred which this company has rated good has failed to pay one hundred cents on the dollar during the last twenty-five years.

CASSIER'S MAGAZINE for August, 1897. New York: Cassier's Magazine Co. This is a special number devoted to ship building and marine engineering, in which a complete story is told of how the modern steamship is designed, built and launched, and how it is fitted up with engines and boilers, and the mass of auxiliary machinery required by modern marine engineering practice, making a magazine number of exceptional size, wealth of information and artistic excellence. Each of the articles in this number were written by a master of his craft.

WILLIAM J. MATHESON & CO., 182 Front St., New York, agents for Leopold Cassella & Co., have just issued several bulletins relating to dyes that they control. We refer to the following: Bulletin containing colored samples produced by the use of Amidonaphtol B. D., and Azotol C. Bulletin showing results obtained by Scarlet E. C. and Wool Red B. Scarlet E. C. is of value for the dyeing of wool, silk and leather, resisting alkalies, acids and sulphur, and is exceedingly fast to light, while Wool Red B. is a product which is distinguished by its bright bluish shade and great fastness to milling. Bulletin showing results obtained by Alkaline Violet C. A., which is represented as a dye especially valuable where it is desirous to obtain shades similar to this firm's well-known Formyl Violets, and where the use of neutral or alkaline baths is preferred.

GUNTON'S MAGAZINE for July, 1897. New York: Political Science Publishing Co., Union Square; price, $2 a year. This issue commences volume 13, and contains its usual valuable reading matter, devoted to practical economics and political science. Among the articles may be mentioned the following: "Philosophy of Protection"; "Growing Sound Opinion on Trusts"; "Dangers of a Wrong Point of View"; "Strikes in Japan"; "Trade and Training in Germany."

GENERAL ELECTRIC CO., Schenectady, N. Y. The fifth annual report of this company has just been received, showing that its gross earnings for its past fiscal year amounted to $12,820,395.87, which after deducting expenses of $11,207,388.65, leaves a balance of $1,613,007.22.

GOULD'S EFFICIENT POWER PUMPS. A very handsome illustrated catalogue has just been issued concerning these pumps, by the Goulds Mfg. Co., Seneca Falls, N. Y. The catalogue illustrates a few of this company's power pumps in operation, and illustrates and describes their complete line of triplex and other power pumps. These are specialties with this company, which was the first to affirm the value of the triplex and exploit its use. This pump has been applied to a very great variety of pump work, and with eminent success. Every pump made by this company is constructed to standard gauges, insuring interchangeable repair parts, made after correct designs, liberal proportions, and in which is used the best material and workmanship.

GRADED WEEKLY WAGES. Boston: Bureau of Statistics of Labor. This is part second of the annual report for 1896 of the Massachusetts Bureau of Statistics of Labor. The report covers statistics relating not only to Massachusetts, but to other states in the Union, and also foreign countries. An idea of what it covers may be gathered from an enumeration of the subjects mentioned in the contents, as "Rates Paid Per Unit of Time"; "Actual Income"; "Prices or Cost of Living"; "The Working Man's Ideal Condition," etc.

QUARTERLY JOURNAL OF ECONOMICS. Boston: George H. Ellis. This is the fourth number of volume eleven of this quarterly, and contains a number of exceedingly interesting and timely articles, such as the following: "The Tory Origin of Free Trade Policy"; "Certain Tendencies in Political Economy"; "The German Exchange Act of 1896"; "The Value of the Money Unit"; "The Career of Francis Amasa Walker." This journal is published for Harvard University.

CENSUS OF THE COMMONWEALTH OF MASSACHUSETTS for 1895. Part II. of Volume II. of the 1895 census of Massachusetts has just been issued from the Bureau of Statistics of Labor, relating to the population and social statistics.

INCANDESCENT LAMPS. The Beacon Lamp Co., New Brunswick, N. J., has just issued a catalogue referring to their manufactures of incandescent lamps, comprising those known as Standards (multiple of all candle powers); Series (arc and incandescent circuit); Candle, Bunghole, Candelabra, Spherical, Battery, Sign, Decorative, Lantern, Surgical, Dental, Lighthouse and Crookes Tubes. This company call especial attention to their method of exhausting incandescent lamps by mechanical pumps, and in no instance do they apply mercury, obtaining by their methods excellent results and a high degree of accuracy. Their 50 to 500 candle power lamps are highly spoken of, the filaments in these lamps being the result of special work, extending over a period of years. Their series lamps, for arc light circuits, are noted for their freedom from blacking and uniformity of current consumed.

MANUFACTURERS' GAZETTE. Published by the Continental Press Co., 97 Dyer St., Providence, R. I. This publication has its headquarters in Providence, R. I., having been moved thence from Boston, and is now under the management of E. D. Chaffee, well known as one of the most popular advertising canvassers in New England, and the editorship of J. Albert Chaffee, who is favorably known to the textile trade of Boston. The paper came

under the new management the first week in July. It is handsomely gotten up, and its editorials are well considered and timely.

WORK AND WAGES OF MEN, WOMEN AND CHILDREN This subject forms the contents of the eleventh annual report of the Commissioner of Labor, Washington, D. C., for 1895-96. This is one of the most interesting reports that has been issued by the Department of Labor. It was undertaken in compliance with an act passed by Congress in 1893, authorizing and directing the commissioner to investgate and make reports on conditions attending the employment of women and children, their wages, earnings, sanitary surroundings, cost of living, etc.

APPLETON'S POPULAR SCIENCE MONTHLY for August, 1897. New York: D. Appleton & Co., 72 Fifth Ave., New York; price $5 per year. This number is filled with interesting matter. Among the subjects treated may be mentioned the following: "The Racial Geography of Europe"; "New Questions in Medical Jurisprudence"; "Principles of Taxation"; "The Thyroid Gland in Medicine"; "The Despotism of Democracy"; "A Tortoiseshell Wild Cat"; "A Lilliputian Monster."

MUSHROOMS OF AMERICA. By Dr. Thomas Taylor, Washington, D. C.: A. R. Taylor. The first number of a series of pamphlets by this author, on the "Mushrooms of America," edible and poisonous, has just been issued. This number is particularly attractive, because of its handsome illustrations. There is no better authority on this subject, living, than Dr. Taylor, who was for a long time the microscopist of the Department of Agriculture, Washington. Dr. Taylor's first public paper on the subject of edible mushrooms appeared in the annual report of the Department of Agriculture, for 1895. This was followed by others. The series will consist of five illustrated pamphlets. Each pamphlet will contain no less than three colored plates, in addition to illustrations in black and white. Diagramatic representations of parts of mushrooms, showing their structural characteristics, will also accompany each number.

Industrial News.

A contract for the transmission of power of the river running through the Santa Ana canyon to Los Angeles and Pasadena, a distance of eighty miles, has been concluded between the Southern California Power Co. and the General Electric Co. The amount of power to be transmitted at first is 4000 h. p. The station will be located in the Santa Ana canyon, twelve miles from Redlands, and about eighty miles from the towns in which the electric power will be utilized. The water will be taken from the river through canal, flume and tunnel along the side of the canyon. Here it will be led into a pipe line 2200 feet long, giving what will be equivalent to a vertical fall in the water of 750 feet. The wheels will be of the impact type, directly connected to the generators, of which there will be four, each of 750 kilowatt (1000 h. p.) capacity. The maximum line potential will be 33,000 volts, to which potential the initial voltage will be raised by twelve 250 k. w. step-up transformers. This transmission will be the longest commercial electrical power transmission as yet undertaken, as well as that using the highest voltage. At present the longest is that transmitting the power of the waters of the Ogden Canyon, in Utah, to Salt Lake City, a distance of 36 miles. The Los Angeles transmission will be over twice that distance, and three times the longest distance yet tried with the power of Niagara, which to date has only been transmitted to Buffalo, a distance of 26 miles.

—The mill men of Charlotte, N. C., have adopted resolutions favoring sixty-six hours as a week's labor, a rate of twenty cents a room per week as rent for operatives, and a system of compulsory education in the State, and opposing the employment in mills of children under twelve years of age.

—Parks & Woolson Machine Company, Springfield, Vt., have just placed one of their combination napper, gig and shear in the mill of the Clinton Mills Co., Norwich, Ct., being the second one placed in this mill; also one of their doubling and rolling machines in the Atlantic Sponging Works, New York City.

—Parks & Woolson Machine Company has just received an order for another double shear, for C. H. & F. H. Stott, Stottville, N. Y., being the third machine of this kind purchased by this concern; also an order has been received from John Legg, agent, Mapleville, R. I., for a steam finishing machine.

—The Saratoga Gas, Electric Light & Power Company, Saratoga, N. Y., have let the contract for the steel work connected with their generator house roof, and the roof over their cold storage building, to the Berlin Iron Bridge Co., East Berlin, Ct. The roofs have steel trusses covered with corrugated iron.

—We call attention to the advertisement, that appears in this issue, of the Clear River Mills, Pascoag, R. I., manufacturers of woolen yarns, single, double and twist, for weaving and hosiery. They make covert cloth yarns a specialty, and do dyeing of raw stock and piece goods.

—We call attention to the advertisement, in this issue, of the Webster Job Dye Works, Webster, Mass., which do dyeing of silk, wool and cotton, manufactured and unmanufactured, making specialties in alizarine, indigo colors and fast black on cotton.

—The well-known firm of James Leffel & Co., Springfield, Ohio, U. S. A., have issued a neat, new pamphlet "D," replete with numerous illustrations and descriptions of the throttling and automatic engines, with portable and stationary boilers, which they are building in a variety of sizes and styles. Copy is sent free to parties interested, on application to the company.

—The United Gas Improvement Company, of Philadelphia, are erecting, at Atlanta, Georgia, a water tower and tank. The tank has a capacity of 10,000 gallons, and is supported on a tower 60 feet high. They have let the contract for furnishing and erecting the tank and tower to the Berlin Iron Bridge Co., of East Berlin, Conn.

—The suggestion of establishing a bleachery for cotton goods, says the News, of Augusta, Ga., is being seriously considered by the business men of that city. Nothing definite is known as to the progress of the scheme as yet, but it is

believed that a bleachery will be established within the city limits at an early day.

—The Phenix Mills Co., Chester, Pa., have opened an Eastern office at 620 Atlantic Ave., Boston. Wm. Browne & Sons, wool dealers of Philadelphia, have their headquarters in the same office.

—Molt Bros., Millbury, Mass., successors to Whitney & Molt, manufacturers of compound indigo blue dyes, are preparng for an active campaign and a large increased demand for their goods, putting their works in order, and expecting a decided increase in business in the near future.

—The Worcester Warp Compressing Machine Co., Worcester, Mass., have perfected a new spooler on the compression principle. The advantages claimed for this spooler are a large increase in the amount of yarn placed on each spool, and also several other advantages, of which we hope to speak later, with illustrations of the machine. The invention is regarded by mill men as one of decided importance and exceptional value.

—The new brushing attachment for circular ribbed knitting machinery, illustrated in our last issue, is well worth investigating by the knitting mills, at this time. One of the few who have seen it in operation, pronounce it one of the most practical and important inventions which has been brought out in the knit goods trade for some time. Chas. M. Musgrove, Pittsfield, Mass., the inventor and manufacturer, will gladly furnish full particulars, and the matter can be easily judged of by the expenditure of a postal card or letter of inquiry.

—Much credit is due Congressman Knox, of Lawrence, Mass., for the good shape in which the tariff is affecting the industries of his city.

—Massachusetts interests owe a debt of gratitude to Congressman Russell, of Connecticut, for the services he rendered them, through his position on the Ways and Means Committee.

—The American Spinners' Cotton Yarn Exchange, with A. B. Sanford, of Fall River, Mass., at the head, has been organized, with headquarters in Boston. The exchange is intended to meet more fully the wants of both yarn makers and their customers than is now done by the commission houses. The idea is modeled largely after the method in vogue in Manchester, England, and is the result of extended investigation as to the working plan there, which comprises the selling of the mill's production through agents on brokerage. Mr. Sanford is well known as a prominent cotton manufacturer.

—The Wool Exchange, New York City, is to establish a series of auction sales of wool, the first to take place August 18, to be followed by sales to occur September 8, September 29 and October 13. The sales will be largely in line with those occurring in London. The sales will be of wools consigned to the warehouses allied with the Exchange.

—The linen industry seems to loom up substantially in Lowell, Mass. The Boott, Merrimack and Appleton Mills have taken hold of it, and under the stimulation of the new tariff it is expected that profitable business will be the result. The first named company took up the manufacture of these goods several years ago, working linen thread into light dress goods and various specialties. The company has been one of the largest importers of linen yarns in the country.

—The Newport News Ship Building & Dry Dock Company are making extensive additions to their already large plant at Newport News, Va. One of the large additions under way is the erection of an extension to their machine shop, which will be 100 feet wide and 200 feet long. This building will be used for the finishing and erecting of marine engines and other large machinery used in connection with the mammouth steel vessels which this company have under way. The central portion of the building will be 50 feet high, and will be supplied with an electric traveling crane capable of lifting and carrying a load of 50 tons. On either side of this central space will be located a gallery, arranged for small machines and fitting tools. The building is to have a steel frame work throughout, and the roof is to be covered with corrugated iron. The Berlin Iron Bridge Company, of East Berlin, Conn., have the contract for furnishing and erecting the steel work of the building.

The Tindell Card Feed.

This feed is made by Henry Tindell, Harrison, N. J., and is especially adapted for feeding wool, hosiery and shoddy cards. A representative of the Textile World visited quite recently the works of Mr. Tindell, and was highly pleased with the merits of this device.

It is simple, accurate and well built, and has been greatly improved. In place of a revolving doffer for keeping the stock back, there has been substituted a reciprocating comb and a spiked apron, made of select stock and put together with metallic links, doing away with leather, and other material. The swinging or rocking back, designed to prevent sorting of stock once in the receiver, is a principle which places this feed well in the front. It is claimed that the rocking back prevents all rolling and sorting, resulting in more even feeding. The machine can be easily regulated to run fast or slow, to weigh out greater or less quantities. It needs no attachments. The principle embodied in Tindell's metallic links for joining feed aprons and covers may be applied to all other makes of feeders, mixing pickers, etc. The maker is prepared to supply feed aprons, hopper aprons, covers, etc., or continuous delivery aprons for whatever duty required. We call attention to the advertisement of this feed in this month's issue.

Chemical Work in Small Mills.

One of the enterprising New York commission houses has retained our consulting chemist to do the chemical and color-work for several of their small mills. While a large mill can afford a first-class chemist (and it may be said that a poor chemist is the most expensive kind of help), a small mill cannot do so and pay for corresponding chemical work. As competition gets more and more acute, it becomes more and more necessary for a manufacturer to effect those small economies, which in the aggregate make all the difference between

profit and loss. The arguments which have been most conclusive in bringing about this employment of one chemist for several mills, are observations of the facts, first, that mills who have once employed a chemist do not let him go readily, but on the contrary increase his salary; secondly, that the work done by those mills employing good color-chemists is immediately picked out by the buyers, just as soon as the sample cards are thrown down on the counter before them; thirdly, that a good chemist can see his way towards making for a mill advantageous bargains between samples of various prices, and finally small economies in the waste products can be effected by a good chemist, more than will repay his expenses for a whole year, in this way. This experiment of employing one chemist for several mills will be watched with interest, and we expect to see other mills doing the same thing.

Fitchburg Railroad Items.

Choice of two routes if you go to the G. A. R. National Encampment at Buffalo via the Fitchburg R. R. Rate only one fare for the round trip. Tickets will include free side trip to Troy and Saratoga.

Through the rapids of the St. Lawrence has long been a famous tourist route, but the trip has been an expensive one. This matter of expense has been obviated by the Fitchburg R. R., G. A. R. trip to Buffalo, via Hoosac Tunnel Route; returning via Niagara Falls, the Thousand Islands and the St. Lawrence River Rapids to Montreal, and direct line to Boston at rate of only $20.25.

Take the tour to Niagara Falls via the Hoosac Tunnel Route, returning to New York via the Hudson River Day Line and to Boston via Fall River Line at rate of $13.80 if preferred.

If you are going to the Adirondacks this year rememeber that the Fitchburg R. R. is the line to take. Through buffet drawing room car service. The Adirondacks were never so popular as they are this year. Possibly this is because they were never so easy of access. Trout fishing around the spring holes was never better than it is this year. You can leave Boston at 8.00 a. m., via Fitchburg R. R., and arrive at Lake Placid the same night.

For particulars address J. R. Watson, Gen'l Pass. Ag't, Fitchburg R. R., Boston, Mass.

MILL NEWS.

Cotton.

New Mills.

—*Alabama, Cordova. The Indian Head Co.'s new cotton mill is now up to the first story, and work is being pushed rapidly forward by the Fiant Building & Construction Co., Palmer, Mass.

—*Connecticut, Putnam. The Putnam Mfg. Co. will build a weave shed to contain their present looms (432, 40" and 45") and as many more 40" and 50" looms, using their present building for carding and spinning. The addition will be run by steam, entirely separate from the present plant. They will make light shirtings, curtains, warp and filling sateens, etc.

—Mississippi, Columbus. It is reported that Northern capitalists will make a proposition for the erection of another cotton mill here.

—Mississippi, Corinth. The Corinth Cotton Mill Co., which has lately been organized in this place, expect to begin building operations soon. W. T. Adams is interested in the enterprise.

—North Carolina, Fayetteville. J. N. Emmett is fitting up his foundry building on Person St. with latest improved carding and spinning machinery and machines for covering cotton mill rollers. He expects to have the plant running about Aug. 1st.

—North Carolina, Randleman. A report says that Dr. T. C. Walker, of Randleman, will build a cotton mill in that place. Numbers 40s to 60s yarns will be manufactured.

—*North Carolina, Waxhaw. The Rodman-Heath Mfg. Co., recently chartered, is building a 10,000 spindle mill. President, W. L. Kluttz; treasurer and agent, S. H. Wiley; superintendent, George F. Seyffert.

—*South Carolina, Greenwood. The new Grendel Cotton Mills expect to start up soon. We understand that a test of the machinery was recently made.

—*South Carolina, Spartanburg. The new Arkwright Cotton Mills are completed, and it is expected the mill will be in operation within two weeks.

—*South Carolina, Switzer. Concerning the report that the farmers in this vicinity propose organizing a company, we are now officially informed that they have organized a company to be known as the Switzer Enterprise Company. Its capital stock is $25,000. D. J. B. Steppe is president and treasurer. The first enterprise of the company will be that of cotton ginning, but it is their intention to erect a cotton mill later on.

—Tennessee, Elizabethton. A spinning mill will be built here, and work on the foundation has already been begun. We understand that the product of the mill will be used by the Elizabethton Net & Twine Co., who are interested in the mill, but we believe a separate company will operate the yarn mill.

—Texas, Jefferson. It is reported that the D. A. Tompkins Co., Charlotte, N. C., is negotiating for a new mill at Jefferson, to cost $60,000.

Enlargements and Improvements.

—Georgia, Atlanta. The Atlanta Exposition Cotton Mill No. 1 has just replaced the old picking machinery with new machines of the Kitson Machine Co., Lowell.

—*Georgia, West Point. The Lanett Bleachery & Dye Works have just completed an addition of a 2-story brick building, 100x78 feet. The capacity of the bleachery is 5 tons per day, and from 30,000 to 40,000 yards of

colored duck in variety of shades are turned out of the dye house. They also finish goods from 4 yd. sheetings to 12 oz. duck. The water supply comes from artesian wells. They have been very successful, and are busy at the present time.

—Massachusetts, Lancaster. The Lancaster Cotton Co., operating the mill at North Lancaster, has been making some repairs and putting in new machinery, during the shut down this week. Work will be resumed Monday, the 26th.

—Massachusetts, Lowell. The Boott Cotton Mills are reported as about to add $20,000 worth of linen machinery.

—Massachusetts, Lowell. It is reported that the Merrimac Mfg. Co. will make some changes in its steam plant, and put in two new engines of 1250 h.p. each.

—Massachusetts, North Adams. The Windsor Co. has made important changes in its plant. The Estey and Stone mills have been shut down, and hereafter all the work will be done at the Eagle Mill. New machinery will be put in by the Kitson Machine Co. and Lowell Machine Shop. Mr. John Cumnock will have charge of the work, which is expected to be completed in about a month. The Estey and Stone mills and adjacent land will be sold.

—North Carolina, Franklinton. It is said that the Stirling Cotton Mills will add a machine shop.

—South Carolina, Abbeville. The Abbeville Cotton Mill Company has obtained authority to increase its capital stock from $200,000 to $300,000, and it is said they will also add 8000 additional spindles.

—*South Carolina, McColl. The McColl Mfg. Co. is now buying machinery for making rope. Charles Iceman is superintendent, and T. B. Gibson, secretary.

—*South Carolina, Orangeburg. The Enterprise Cotton Mills have placed orders for their new machinery. It is expected that before long 10,000 spindles and 300 looms will be running.

Mills Starting Up.

—Alabama, Anniston. The machinery in the Gold Medal Twine Mills of the American Net & Twine Co., of Boston, has been started up, giving employment to about 150 hands.

—Alabama, Selma. The Selma Cotton Mill Co. has employed many of the former operatives in the Matthews Cotton Mill Co., which is financially embarassed. The Selma Co. will run night and day.

—Connecticut, Pine Meadow. The mill of D. B. Smith & Son is now running full time. They were stopped for a little while, but the bulk of their machinery is now in operation.

—Georgia, Savannah. The Savannah Cotton Mills are reported as about to start up shortly. Teey will put in new picker plant and 25 new cards.

—Louisiana, New Orleans. The Maginnis Cotton Mills, corner of Annunciation and Calliope Sts., which have been closed during the past week for repairs, have again started up.

—Maine, Biddeford. The Laconia Co. started up 100 looms in its flannel department last Monday, the 19th, which had been idle for a year.

—Massachusetts, Blackstone. The Blackstone Mfg. Co. will start its mill Monday, July 26th. They have been shut down for one week only.

—Massachusetts, Lowell. The Tremont & Suffolk Mills and the Merrimac Mfg. Co. will continue running their machinery steadily during the summer.

—New York, Brooklyn. The mills of the Standard Rope & Twine Co. are once more in operation.

—New York, Watertown. Operations have been resumed in the plant of Robert McHaffe, of this place. For the present, denims and white drills will be manufactured.

—North Carolina, Charlotte. The Ada Cotton Mills have started up, having been shut down about two weeks.

—North Carolina, Monroe. The Monroe Cotton Mills have been recently incorporated by Allen W. Heath, O. P. Heath and Wm. C. Heath. The plant is now in operation.

—Pennsylvania, Philadelphia. The new cotton mill of C. J. Milne & Sons, at Washington Ave. and 10th St., has commenced operations. At present, 240 looms are being operated, on cotton and worsted dress goods.

—Rhode Island, Ashton. Ashton Mills were started up July 26th, after a shut down of one week.

—Rhode Island, Central Falls. The mills of the United States Cotton Co. were started this week, after the shut down caused by a broken crank shaft.

—Rhode Island, Hope. The Hope Co. has been putting in new spinning frames, and the mill was shut down this week. It will be started up Monday next.

—*Rhode Island, Lonsdale. The Lonsdale Co. started up last Monday on full time, after a shut down of one week.

—Rhode Island, Woonsocket. The Hamlet Mills have resumed running full time. They have been on short time for two weeks.

Mills Shutting Down.

—Connecticut, Willimantic. The Windham Cotton Manufacturing Company is closing down. Poor business is the reason given for the closing of the mill.

—Georgia, Gainesville. A report states that owing to certain difficulties, the cotton factory operated by the Georgia Mfg. Co., at Gainesville, has been shut down, and a call for an immediate meeting of the stockholders has been given, and it is more than probable that the mills will not remain idle for any length of time.

—Illinois, Aurora. Aurora Cotton Mills closed down July 22nd, on account of the coal famine resulting from the strike. 600 hands are employed.

—Massachusetts, Fall River. The Stevens Mfg. Co. has shut down its mill for a month.

—Massachusetts, Fall River. The No. 3 Hargraves Mill discontinued running between 100 and 200 lappet looms, July 6th. Report says that when the looms are again started, a new class of goods will be made.

—Massachusetts, Lawrence. The Atlantic Cotton Mills will shut down four weeks, beginning July 30th.

—Massachusetts, Lowell. The Lawrence Mfg. Co. will suspend work for three weeks this summer for the purpose of making extensive changes in the machinery.

—*Massachusetts, Salem. The Naumkeag Cotton Mills shut down for two weeks commencing August 2nd.

—Massachusetts, Taunton. The Elizabeth Poole Cotton Mill is closed down for two weeks.

—Massachusetts, Webster. The Stevens Linen Works are closed for two weeks, as is usual at this time each year.

—Massachusetts, Wilkinsonville. The Sutton Mfg. Co. has just closed down for an indefinite period.

—New Hampshire, Manchester. The Amoskeag Mills will close down Aug. 7th for the remainder of the month.

—North Carolina, Concord. The Odell Mfg. Co. will shut down for about two weeks, the middle of August.

—North Carolina, Lexington. The Wennonah Cotton Mills are running four days a week.

—North Carolina, Raleigh. The Caraleigh Mills Co. are now running eight hours a day and will so continue until the new cotton crop can be obtained.

—North Carolina, Rockingham. The Great Falls Mfg. Co. shut down its mill about two weeks ago, it is said, owing to scarcity of cotton.

—Rhode Island, Woonsocket. The Ballou Mill will shut down July 31st indefinitely.

—Rhode Island, Woonsocket. The Guerin Spinning Co., which has been running its mill night and day for the past three months, will discontinue running nights.

Woolen.

New Mills

—Ontario, Hastings. H. M. Fowles has started to rebuild his carding mill.

—*Oregon, Union. Work on the building of the Union Woolen Mills is being pushed forward as rapidly as possible. Some of the machinery has already arrived for the mill.

—Peru, Lima. It is reported that a company has been formed here for the purpose of manufacturing felt hats. The machinery and supplies will be purchased in the United States, and it is said that the new organization have a paid-in capital of $200,000. Flint, Eddy & Co., of New York, can probably give some information.

—Rhode Island, Central Falls. A new company, known as the Rhode Island Spinning Co., now occupies the mill formerly used by the Rhode Island Hosiery Co. They manufacture woolen and merino yarn for all purposes and do commission spinning.

—Rhode Island, Thornton. Charles Fletcher has started work on the foundation of a second worsted yarn mill at this place, 225x75 feet. The new Pocasset Worsted Mill, owned by Mr. Fletcher, is now nearly completed.

Enlargements and Improvements.

—Connecticut, Somersville. The Somersville Woolen Mill Company are putting in a new iron penstock and two new turbine water wheels.

—Massachusetts, Rochdale. The J. D. Clark Co. is making slight alterations in its mill, although we understand no machinery will be put in.

—New Hampshire, Ashland. Hart, McArthur & Hart propose to build a new weave shed, and the town has exempted it from taxation for ten years.

Mills Starting Up.

—*Connecticut, Staffordville. The new company which has bought the old Hope Woolen Mill, will be known as the Summit Woolen Co. Wm. H. Coe, president and treasurer, Thomas Rawley, secretary and assistant treasurer.

—Maine, No. Dexter. Dews Woolen Mill has started on night work again, and will run 24 hours daily.

—Massachusetts, Cherry Valley. The Chapel Mill, owned by the estate of N. Darling, has been sold to C. S. Smith for about $30,000. The report states that the mill will be started up on full time in a very few days.

—Massachusetts, Clinton. The Bigelow Carpet Co. this week started its carding and combing departments, and it is expected that the entire plant will soon be running.

—Massachusetts, Collinsville. Twenty-five looms are now being operated in the Collins Mill, and more are being started each day.

—Massachusetts, Franklin. The Ray Woolen Co.'s mill, which has been shut down since July 3rd, will probably start up about Aug. 1st.

—Massachusetts, Millbury. We have a report that Newton Darling is resuming operations in his woolen mill at Millbury. The mill has been idle since last winter.

—Massachusetts, Monson. The Central Mill of D. W. Ellis & Son has begun running on full time.

—Massachusetts, North Billerica. Operations in the mill of the Faulkner Manufacturing Co. will soon be resumed.

—Massachusetts, Spencer. The Westville Woolen Mills, owned by William and Alfred Dufton, are starting up.

—Massachusetts, Uxbridge. The Hecla Woolen Mill, which closed down some three weeks ago, has started up.

—New Jersey, Malaga. The Malaga Carpet Co. has started its mill after a long shut down.

—Pennsylvania, Camden. The Croft & Priestley Woolen Mills, in South Camden, which have been shut down for several months, it is stated will resume operations next month under the management of Seth B. Stitt, representing Philadelphia and New York capitalists, who have leased the mill.

—Rhode Island, Centredale. The Centredale Worsted Mills will resume all night work in its combing and drawing rooms this week.

—Rhode Island, East Greenwich. The Livingston Mills expected to start up about August 1st. They will make a very high grade of fine worsteds.

—Rhode Island, Harris. The woolen mills at this place started up this week, after an idleness of a few weeks.

—Rhode Island, Phenix. The John Pearce Woolen Mill is to start up soon, after an idleness of several weeks.

—Vermont, Bennington. The mill of George Rockwood & Co. started up August 1st on full time.

Mills Shutting Down.

—Massachusetts, North Adams. The Linwood Woolen Mill, owned by S. W. Barker, of Troy, closed for two weeks, to make repairs.

—Massachusetts, Roxbury. The Roxbury Carpet Mills have closed down. The company expect to resume operations again in about two weeks.

—Massachusetts, Uxbridge. The mill of Royal C. Taft, formerly the Capron Woolen Mill, has been obliged to shut down Saturdays and Mondays, owing to low water.

—New Hampshire, Tilton. Machinery in the lower Tilton Mills is being removed to the upper mill, and work will be stopped at the former plant.

—New York, Waterloo. The Waterloo Woolen Mfg. Co. has shut down its mills two weeks for repairs.

—Oregon, Pendleton. Pendleton Woolen Mills have been forced to shut down temporarily because of a breakdown in their engine. They have been running night and day.

—Pennsylvania, West Conshohocken. The woolen mills of George McFarland and C. Harrigan have been shut down during the past week.

—Rhode Island, Pascoag. The Stone Worsted Mill, which has been running over-time for the past two months, has given up its over-time work.

Knit.

New Mills.

—Delaware, Smyrna. There is a report that Clarence Prettyman is making preparations for starting a hosiery factory in Smyrna within a short time.

—Michigan, Grand Rapids. E. A. Clements is starting up a new knitting factory at 62 Pearl St. The machinery is now being installed, and will be ready to run about the middle of August.

—*North Carolina, Greensboro. The George Manufacturing Co., manufacturers of hosiery, are now operating about 12 machines in one of the buildings owned by the Southern Finishing & Warehouse Co.

—*Pennsylvania, Phenixville. We understand that the Perseverance Knitting Co., now at Spring City, Pa., will move to this place. Their plant was recently destroyed by fire.

—Pennsylvania, Pottstown. Fritz & Krause, proprietors of the Royersford Knitting Mills, Royersford, will establish a branch mill here. 36 hands will be employed at first, and operations are expected to begin about Sept. 1st.

—Vermont, Bennington. It is reported that another knitting mill will be established here. A special town meeting will soon be held, regarding the exemption of the new company from taxation. It is said that $30,000 has been subscribed, largely by out of town people.

Enlargements and Improvements.

—Delaware, Wilmington. The Wilmington Hosiery Co. will build an addition to its mill on Lancaster Ave. The work is in charge of A. S. Reed & Bro.

—Massachusetts, Lowell. The Lawrence Hosiery Mills shut down for three weeks, in the month of August. During the shut down, some extensive changes will be made in No. 10 mill.

—*New York, Cohoes. It is reported that plans are being made, but are not yet completed, for the addition to the Pearl Knitting Mill, John F. Quinn, proprietor.

—North Carolina, New Berne. The Clearmont Knitting Mills are moving their equipment of 30 machines to a larger building, where 80 new machines will be added.

—*North Carolina, Salisbury. The Salisbury Hosiery Mills have started up. Manager S. J. Wiley states that they will run full time. Ten knitting machines were put in, making 40 knitting machines. This company was formerly known as the Rowan Knitting Mills, which were reorganized.

—Pennsylvania, Ephrata. The Ephrata Knitting Mill, owned by F. S. Weaver, is putting in eight new knitting machines, and it is said that the plant will be further enlarged soon.

—*Pennsylvania, Plymouth. The new addition being built to the Pioneer Knitting Mills is about completed. When all is ready for starting, about 100 additional hands will be employed.

—Pennsylvania, Spring City. W. C. Urner & Co. have ordered sixty new machines for their hosiery mills.

Mills Starting Up.

—Connecticut, Rockville. A new company has been organized to operate the plant of Samuel Fitch & Son Co., with the following officers: President and manager, Frank S. Olds, Rockville; secretary, E. B. Browne; treasurer, T. E. Tillinghast, both of Providence. The capital stock of the old company, $50,000, will be increased. Mr. Olds was with the old company eleven years. It is understood that the mill will be put in operation very soon.

—Illinois, Watseka. The Classic Underwear Co. has resumed operations in its knitting mill.

—Massachusetts, Methuen. Work has been partially resumed by the Knitted Fabric Co., and the works will be soon running in full.

—New York, Cohoes. McDowell & Co. are now operating their Cascade Mills on full time. They have been running slack some time past.

—New York, Cohoes, The Empire Knitting Mill, John A. Nuttal, proprietor, which has been running on short time, is now running on full time with a full force of help.

—New York, Cohoes. The idle Granite Mill will be started up shortly.

—New York, Cohoes. The Royal Knitting Mill, operated by Shaver & Owen, has commenced running on full time.

—New York, Cohoes. The Atlantic Knitting Co. has started up four sets on full time, and the Parsons Mfg. Co. has also started up.

—Pennsylvania, Du Bois. The Du Bois Knitting Mill Co. which has been in liquidation for some time past, is making preparations for resuming operation in the near future.

Silk.

New Mills.

—Connecticut, Willimantic. J. D. Chaffee, who bought 218 silk braiding machines at the Natchaug Silk Co. auction, is setting

them up in the old brick mill at the corner of Church and Valley Sts.

—New York, Middletown. It is reported that James Miller, formerly silk manufacturer in Paterson, N. J., has bought the mill on Pease Ave., built for the B. F. Hallet Shoe Co., and that 60 to 100 hands will be put to work as soon as possible.

—North Carolina, Greensboro. It is reported that Mr. Joseph Bamford, Jr., representing one of the largest silk manufacturers in Paterson, N. J., has been investigating a mill location on the Southern Railway, and that Greensboro has been decided upon. Report states that the new plant will cost nearly $1,000,000, and will employ 1500 operatives.

—Pennsylvania, Bath. Concerning the report that we made in our last issue that a new silk mill would be erected in Bath, we are informed that work on the foundation is to be commenced July 15th. It is the aim of the company to have the building finished so as to begin production of goods about Oct. 15, '97. The goods manufactured will be dress silk, silk tie goods and silk linings. Steam will be the motive power. The name of the company is withheld for a few weeks.

—Pennsylvania, Pennsburg. There is a rumor that a large silk mill will be built here by Paterson, N. J., capitalists.

—Pennsylvania, Scranton. Levy Bros., 71 Greene St., New York, are receiving bids for their new mill here, planned by Architect Cohen, of New York. Mills will probably be in operation by Jan. 1, '98.

Enlargements and Improvements.

—*Pennsylvania, Bethlehem. Gudebrod Bros. & Co., whose New York office is 7 Lafayette Place, inform us that they have made no change in their mill, but are looking around for a new site. They were reported last week as about to move their Bethlehem mill to Pottstown, Pa.

—Pennsylvania, East Greenville. The Columbia Silk Mill desires a larger building, and it is expected the citizens will grant this request.

Mills Starting Up.

—Pennsylvania, Alburtis. The new Alburtis Silk Mill has just started up on sample dress work. Fifteen looms are in operation.

—Pennsylvania, Scranton. The Meadow Brook Silk Co., whose mill has been idle since July 4th, has started up. A larger engine and improved machinery have been put in.

Miscellaneous.

New Mills.

—*Kentucky, Covington. We find that the Reliance Textile & Dye Works, recently incorporated at Cincinnati, is the same practically as the Reliance Dye & Finishing Works, already located at this place, with capacity of 8 tons per day.

—Massachusetts, Lawrence. A report says that E. Frank Lewis, the wool scourer, is making preparations for the building of a new factory near Mt. Vernon St.

—North Carolina, Tarboro. It is reported that John F. Shackelford has induced Messrs. Morningstatt and Orthfurth, of Philadelphia, to establish a steam dye house and bleachery here. They will put up a building 80x25 feet, exclusive of boiler and engine house. The plant will give employment to 15 people.

—Pennsylvania, Chester. A report states that a large English syndicate operating lace curtain manufacturing plants, contemplate starting a plant at this place, in a building which must be at least 500 by 200 feet, also an extension to be used for bleaching purposes. Should the project be carried through, from 125 to 150 hands will be employed.

—Pennsylvania, Philadelphia. A charter is desired for the Utilis Mfg. Co., to manufacture and sell Utilis sanitary napkins, toilet and bath articles, by Henry A. Smith, Richard B. Nichauls, Harry A. Smith, Albert H. Silpath and Michael J. Keating.

—*Rhode Island, Pawtucket. The new hair cloth mill, which we reported previously would be erected in Central Falls, is to be located in this city instead. The entire top story of P. Jenk's mill will be occupied. The 20 looms to be used have been designed by Mr. MacAllen and O. S. Brown, the latter party being interested in the new concern. The name of the concern is the French Hair Cloth Co.

Enlargements and Improvements.

—Connecticut, Jewett City. The Aspinook Co. are having plans prepared for an addition to their bleachery, which will be 200x60 feet.

—Massachusetts, Fall River. Two new boilers are being placed in the boiler house of the Shove Mills.

—New York, Cohoes. A new boiler will be placed in position in the Victor Mills; during the week the water is withdrawn from the Cohoes Co.'s canals.

—Rhode Island, Manton. Joseph D. Minto is building a new boiler house, in which he will place a new boiler.

—Vermont, Ludlow. The Black River Woolen Co. closed its mills for a short time, in order that a new boiler may be installed.

Mills Shutting Down.

—New York, Cohoes. The annual repairs to the canal will be made during the week beginning Aug. 15th. This necessitates a shut down of all the mills. The Pearl Mill will put in a water wheel, and the Victor Mills an engine.

—Rhode Island, Lonsdale. The bleachery of the Lonsdale Co. closed down Wednesday last.

Fires.

—New York, West Sand Lake. A small fire occurred July 15th in the picker room of J. & R. McLaren's knitting mill. The automatic sprinklers worked quickly, and the loss was only about $300; insured. The mill is shut down, pending repairs.

—Ontario, Hastings. H. M. Fowld's woolen mill was totally destroyed by fire July 6th. Loss on the building was $2000; uninsured.

—Pennsylvania, Mt. Joy. The cotton mill of George Brown's sons suffered $12,000 loss by fire July 15th. The fire started in the picker, on the second story, and the machinery here was badly damaged, loss being estimated at about $7000; fully insured. Repairs have been started, and the mill will resume operations as soon as possible.

—Pennsylvania, Philadelphia. The Lehigh Mfg. Co.'s mill was recently damaged by fire to the extent of $8000, the principal loss being upon looms.

Failures and Suspensions.

—Massachusetts, Wales. The Excelsior Woolen Co. has filed a voluntary petition of insolvency. The mill has not been running for some little time, and it is thought that the concern will be wound up.

Facts and Gossip.

—Alabama, Mobile Co. There is a report that a Chicago syndicate has purchased a tract of 50,000 acres in Mobile Co., and that a colony will be settled, and a large cotton mill built. The names of interested parties are given as follows: Dion Geraldine, J. F. Renay, G. G. Benedict, R. F. McElroy, J. W. Kity, M. S. Dinslo, F. C. Crowe.

—Alabama, Union Springs. The Union Springs Cotton Mills are now employing negroes in the picker, carding and drawing rooms. Negro boys are also tending the backs of the mule carriages.

—Georgia, Columbus. The stockholders of the Eagle & Phenix Mfg. Co., at their meeting July 8th, elected a new board of directors, as follows: J. H. Martin, C. A. Collier, W. G. Solomon, A. C. Young, Samuel Eberhardt, J. A. Atwater, E. L. Clemence, Joseph King and R. Herzfeld. The meeting was strongly in favor of reorganizing, and a plan was recommended for issuing $1,000,000 bonds.

—Georgia, Macon. The Weeks Mfg. Co. has been incorporated with a capital stock of $50,000, to manufacture clothing, hosiery, underwear, etc. C. H. Weeks, J. Pate Stetson, and C. M. Bolfeuillet are the incorporators.

—Maine, Gardiner. The Gardiner Woolen Co.'s plant is now leased to F. J. Goodspeed, who runs it in connection with his other mill at Wilton, Me., and the same data that applied to the Gardiner Woolen Co. as to machinery, will probably apply to this mill.

—Maryland, Oella. William J. Dickey & Sons are now making exclusively heavy cotton duck and woolen goods, they having given up work on muslin goods, which has thrown out of employment about 150 hands.

—Massachusetts, East Brookfield. Winfield Scott & Co. have just put in a new 90 h. p. water wheel. Several new looms will also be installed.

—Massachusetts, Lee. The shoddy mill of the late Geo. T. Bostwick is offered for sale.

—Massachusetts, New Bedford. It is said that on August 1st, Andrew G. Pierce, Jr., treasurer of the Pierce Mfg. Co., will accept the position of treasurer of the Howland Mills Corporation and the Rotch Spinning Corporation, upon their reorganization.

—Massachusetts, New Bedford. The court has authorized the receivers of the New Bedford Mfg. Co. to take 51 shares of stock, and the Rotch Spinning Corporation, 230, in the newly organized Howland Mills, of this place, in half payment of the indebtedness of the old Howland Mills. The old Howland Co. is indebted to the New Bedford Co. for $10,263, and the Rotch Spinning Corporation, for $64,000.

—Massachusetts, Ware. At a meeting of creditors of the Excelsior Woolen Co., held at Springfield, the assignees were directed to start the mill, and run out the stock of raw material. It is said that it will require three months to do this.

—New Jersey, Paterson. The New Jersey Silk Co. has entered a replevin suit against Alexander McMunn, to recover nine looms, four warp frames, and sundries valued at about $1000.

—New York City. E. H. Baker, formerly agent of the Otis Co.'s mills, at Ware, Mass., on July 1st was admitted to the firm of Bliss, Fabyan & Co. Mr. Baker has been with the New York office of this firm for two years.

—New York, Cohoes. The Himes Underwear Co. will be forced to run until midnight for some time in the ribbed goods department to fill its orders.

—New York, Cohoes. Wm. A. Nuttall, proprietor of the Halcyon Mill, has voluntarily given all the departments of his mill an increase of 25 cents in wages.

—New York, Cohoes. As mentioned some time ago, the Parsons Manufacturing Co. is going to take possession of the Standard mill, which they purchased several months ago, and which was formally transferred the first week in July. The company will build two additions to the present building, and on the expiration of the lease of their present plant, May 1st, 1898, will take possession of the Standard. The latter mill will probably be in readiness November 1st, but it will not be operated so soon. The machinery in the present plant will be used in the new plant, but it is more than likely some new machinery will be purchased. Charles Hay is superintendent of the Parsons mills.

—New York, Frankfort. The Frankfort Linen Mfg. Co. has increased its capital stock from $50,000 to $75,000; $45,000 is paid in.

—New York, Potsdam. All the knitting machines, garnett machines and ribbed knitting machines in the mill of the Potsdam Knitting Co., have been sold to a Connecticut party for $7000, and shipped away. This company was unfortunate from the start.

—New York, Sherburne. A report says that John Wild, of the Oneita Knitting Mill, J. E. McLoughlin, of the Mohawk Valley Cap Factory, and others from Utica, will, if possible, with the help of Sherburne people, resume operations in the Sherburne Knitting Co.'s Mill, which is now idle.

—New York, Troy. John H. Peck, as referee, has reported favorably on the petition of the directors of the Wynantskill Knitting Co., that the company be dissolved, and a permanent receiver appointed.

—North Carolina, King's Mountain. Dilling Cotton Mill, at the annual meeting of its stockholders, declared a dividend of 8 per cent. on a capital stock of $185,000. Half will be paid now, and half Jan. 1st, 1898. Capt. F. Dilling is treasurer and manager.

—North Carolina, Milledgeville. The Yadkin Falls Mfg. Co. will be reorganized. A meeting was recently held by the representatives of the creditors and bondholders, namely: Lee S. Overman, Theo. F. Klutz and L. H. Clement, of Salisbury, and A. M. Chase, of Philadelphia, for the purpose of reorganizing and restocking the company, and starting up the mill. The plant will be sold at auction on Aug. 9th. The factory is a three-story brick building, containing 3840 spindles and other machinery.

—Rhode Island, Washington. Jos. Dews' mill is now rapidly being equipped with machinery, but has not yet started up. They make their own worsted yarns, we understand, and will probably get the yarn plant in operation some time before the rest of the mill is started. It will be equipped with entirely new machinery throughout.

—Tennessee, Knoxville. The Knoxville Knitting Mills are behind their orders, and will put on a night force this week.

—Tennessee, Sweetwater. The Sweetwater Woolen Mills have started this week to run night and day, that they may keep up with their orders.

—Wisconsin, Janesville. The Rock River Cotton Co. confirm the report that they have started the manufacture of twine. It is not, however, a separate enterprise, being carried on in their present mill. They have simply added machinery for manufacturing cotton wrapping twine, giving employment to about 15 additional hands. They have put in 1000 twister spindles.

—Wisconsin, Milwaukee. The Phenix Knitting Works, formerly owned by Chas. P. Button, have now been incorporated with $50,000 capital stock. The incorporators are Wm. S. Fish, Edward J. Paul and Henry J. Droppers.

PERSONAL RECORD.

Cotton.

—W. H. Cotton, formerly superintendent of the White Mills, at Rockville, Ct., and lately connected with the TEXTILE WORLD in charge of the Employment Bureau, has accepted the position of manager of one of Wm. Parks & Son's, Ltd. mills, at St. John, N. B. Mr. Cotton carries with him the best wishes of his many friends, and none more hearty than those of the publishers of the TEXTILE WORLD. The Information Department and Employment Bureau is now in charge of a member of the firm, who gives close personal attention to it.

J. W. Wilson has been promoted from the position of assistant superintendent to that of superintendent at the Batesville Cotton Mills, in Greenville, S. C.

Squire Stansfield has been succeeded by Patrick Barrett as overseer of carding in the Conanicut Mill, at Fall River, Mass.

Ferdinand Rodliffe, assistant superintendent of the Hamilton Cotton Mills, Lowell, Mass., has severed his connection with that company after a service of seventy years.

R. B. Page, who held a position as card grinder in the Lanett Mills, West Point, Ga., has accepted a position as boss carder with the Eagle & Phoenix Mfg. Co., Columbus, Ga., of the No. 2 mill.

Charles H. Smith, who for the past ten years has had charge, as overseer, of the carding room in the China Mill, Suncook, N. H., has severed his connection with that corporation. His room will for the present be looked after by John Gardner, the overseer of the same department in the Webster and Pembroke mills.

Charles A. Smith has resigned his position as overseer of carding with the China Mfg. Co., Suncook, N. H., where he has been for 10 years. The operatives presented him with a handsome clock.

O. B Tilton, formerly agent of the Dwight Mfg. Co.'s mill at Alabama City, and recently with the Tremont & Suffolk Mills, Lowell, has resigned his position there, and purchased an interest in a hay and grain business at Nashua, N. H.

Walter M. Scranton is now overseer of spinning and spooling at the Charleston (S. C.) Cotton Mills. He was formerly with the Rochester Cotton Mills, Rochester, N. Y.

Thomas Crocker has succeeded J. D. Friday as overseer of carding at the Beaumont Mills, Spartanburg, S. C. The spinning is in charge of D. E. C. Clough.

The Warren Mfg. Co., Graniteville, S. C., has elected C. A. Robbe, of Augusta, Ga., as president, to succeed Chas. W. Davis, who resigned.

E. B Hayden, superintendent of the Prosperity Mills, S. C., has resigned and returned to his home in Plymouth, Mass.

John K. Coit is now boss dyer for the Henrietta (N. C.) Mills He has just given up his position with the Salisbury (N. C.) Mill.

D. B. Rodman is now superintendent of the Walhalla (S. C.) Cotton Mills. He was formerly with the Mountain Island (N. C.) Mills. B. R. Westmoreland has charge of the weaving at the Walhalla mill.

John Brown is now boss weaver in No. 3 mill of Eagle & Phoenix Mfg. Co., Columbus, Ga.

James Wallace, for many years boss weaver at the Exposition Mills, Atlanta, Ga., has left his position there and entered the mercantile business. M. P. Brown is his successor at the Exposition Mills.

Thomas Shuttleworth, of North Carolina, has succeeded Wm. Claridav, who has held the position of overseer of the dressing department in the Eagle and Phenix Mills, at Columbus, Ga.

W. G. Tice, of Clifton, S. C., has accepted a position as second hand of a spinning room at Spartanburg, S. C.

W. E. Williams, formerly second hand in the spinning department of the Southern Cotton Mills, Bessemer City, N. C., has accepted a similar position in the Henrietta Mills, at Henrietta, N. C.

Hanson O. Reed, who recently resigned his position as second hand in No. 5 mill for the Cocheco Mfg. Co., Dover, N. H., had been with that company for 47 years.

E. L. McDaniel has resigned his position as section hand in the weaving department at the Spartan Mill, of Spartanburg, S. C., and gone to Greensboro, N. C.

John Aspin, formerly section hand at the Tecumseh Mill No. 3, has succeeded John Duckworth as second hand of weaving in the Chace Mill, Fall River, Mass.

Miss Angie Leedham succeeds Miss Emily Knifeton as book keeper in the Columbia Manufacturing Co.'s mill, at Greenville, N. H.

George Fish is the new overseer of weaving at the Warwick Mills, Centre-

ville, R. I., taking the place of Thos. Horrocks. Mr. Fish comes from the Montreal Cotton Co.

Frank J. Narramore, manager of the Bridgeport Coach Lace Co., has just been appointed by Pres. McKinley, Collector of Customs, for Bridgeport.

W. K. Parker, formerly of Fayetteville, N. C., is the new superintendent of the Wayne Cotton Mills, which are expected to start about the 1st of October.

John E. Shaw has returned to his old position as overseer of the weaving at Steele's Mills, Rockingham, N. C. He has been recently at Durham.

Joseph W. Johnson, formerly of Blacksburg, S. C., is the new overseer of weaving at the Arkwright Cotton Mills, Spartanburg, S. C.

Marshall Crowell will accept a position with the Odell Mfg. Co., Concord, N. C. He was formerly with the Carbarrus Cotton Mill.

A. Smith of Newberry, N. C., is now overseer of weaving at the Charleston Cotton Mill, Charleston, S. C.

Robert Wilson, Jr., is now with the Edna Cotton Mills, Reidsville, N. C. He was recently with the Clinton, S. C. cotton mills.

Thomas Stone, lately in charge of St. John Cotton Mill, has moved to Adams, Mass., to take charge of weaving and designing of the Berkshire Cotton Mfg. Co.

Samuel Ogden, who has been in the south for the past two months, has returned to Paterson, N. J.

Woolen.

Frank Ambach, Jr. formerly of Hyde Park, accepted a position as boss weaver with the Merchants Woolen Co., Dedham, Mass.

S. Moore has resigned his position as superintendent of the Columbia Worsted Co., Wallingford, Penn.

Charles H. Woodbury, of Franklin, Mass., is now superintendent of S. A. Owen's mill at Hope Valley, R. I.

James McDowell, formerly at Manton, R. I., has accepted a position at the Rock Mills, Rockville, Conn., as overseer of dyeing.

Miles Farrer, who held position as overseer of weaving at the Clear River Woolen Mill, at Bridgeton, R. I., has resigned.

George Shortwell, formerly overseer of worsted yarn dyeing for the Globe Woolen Co., Utica, has resigned.

Charles F. Foster, who was boss dyer at the Rock Woolen Mills, Rockville, Conn., died recently as a result of being thrown from a horse.

Philip M. Smith, who has for some time been superintendent of the Henderson (Ky.) Woolen Mills, is now treasurer of the mills.

Christopher T. Brooks, the Director of the Lowell Textile School, who has been travelling in England and on the continent during the past six weeks, returned the latter part of July. Mr. Brooks visited most of the textile schools of Europe, and gained much information of value in the line of technical education. He feels very much encouraged, and believes it will only be a few years before the Lowell School is on a par with the best institutions.

Paul Wetstien has resigned his position as boss weaver of the Merchants Woolen Co., Dedham, Mass.

David McArthur, formerly of Lowell, Mass., is now in charge of the carding at Ludlow, Vt.

Daniel Byron has resigned his position as second hand in the finishing department of Simson & Kirkaldy's woolen mill, Woonsocket, R. I.

W. J. Adams, lately of Lawrence, has accepted a position in charge of finishing at Bridgewater, Vt.

James F. Lamb has resigned his position as overseer of finishing at the Simson & Kirkaldy Woolen Mil, in Woonsocket.

Richard Marsden has accepted a position with Sayles & Jenks, Warren, Mass., as overseer of spinning.

Alexander Murray, formerly with the Washington Mills Company of Lawrence, Mass., has accepted a position as designer for superintendent J. M. Masson, in the Collins Mill, Collinsville, Mass.

Walter Appleton of Conshohocken, Penn., has accepted a position as overseer of finishing for the Melrose Woolen Co., Auburn, N. Y.

Peter F. Eberhardt, of Jefferson Mass., has accepted a position with the Thos. Kent Mfg. Co., Clifton Heights, Pa., as boss carder.

The Yantic Woolen Co., Yantic, Conn., has engaged Wm. Clayton, of Cherry Valley, Mass., as boss finisher.

Lyman Copeland has succeeded James O. Kelley as overseer of finishing in the Oak Valley Mills, at Burriville, R. I.

W. S. Porter, formerly with the Worumbo Mills, at Lisbon Falls, Me., has accepted a position in the Indian Spring Mill, Madison, Me.

James Lynch, of Amesbury, Mass., has accepted a position as section hand in the weaving department for the Dews Woolen Co., North Dexter, Maine.

Knit.

H. T. Bankoton has succeeded Capt. Becker, resigned, as superintendent of the Grantville Hosiery Mills, Grantville, Ga.

Charles Sanderson, formerly of New York, is now in charge of the knitting department of the Union Mfg. Co., Frederick, Md.

Albert Musgrove, formerly of Webster, Mass., has taken charge of the worsted yarn dyeing for the Globe Woolen Yarn Co., at Utica.

Silk.

Edward J. Cadman has resigned his position in the finishing department of Cheney Bros. mill at So. Manchester, Conn., on account of his health. He has worked for the company for nearly thirty years.

James A. Taylor has recently accepted a position with Collins & Aikman Co., of Manayunk, manufacturers of silk plushes. He is overseer of finishing. He was formerly with the Silk-Lour Co.

Miscellaneous.

Thos. Horrocks has resigned his position as overseer of weaving in the Warwick Mills, Centreville, R. I., to accept a similar one at St. John, N. B.

L. W. Powers, formerly at So. Hadley Falls, but more recently with the Parkhill Mfg. Co., Fitchburg, Mass., has accepted a position with the Grinnell Mfg. Co., of New Bedford, Mass.

J. M. Splawn has accepted a position as superintendent of the Clinton (S. C.) Cotton Mills. He was formerly overseer in the Spartan Mills, Spartanburg, S. C.

Chas. Prew, formerly overseer of carding in the Canoe River Mills, Taunton, Mass., has accepted a position with the No. Dighton Mill, No. Dighton, Mass.

Robert Woodside, of Hamilton, has succeeded J. Sheldon Davis as manager of the Canadian Colored Cotton Mills, at Merriton, Ont. M. S. Foran takes the position of boss weaver.

Miles Ellis, overseer spinning, Washington Mills, had a stroke of paralysis last week in the mill.

Jackson Thorne has taken the position as overseer of the card room in the Crosby Mfg. Co.'s mill at East Glastonbury, Conn.

John Henzie, formerly boss weaver at the Madison Woolen Co., Madison, Me., has been promoted to assistant superintendent.

Samuel B. Eaton, who died last week of consumption at Denver, Col., was at one time overseer of the Waltham Dye Works, and later, superintendent of the Quaker City Dye Works, Philadelphia. Later, he was superintendent of the Turkey Red Dye Works, Providence, which position he was obliged to resign on account of poor health. He was 36 years of age.

Thomas O'Donnell was unanimously chosen as secretary of the Fall River Spinners' Union, to fill the vacancy caused by the resignation of Robert Howard. Mr. O'Donnell has had considerable experience in the past during Mr. Howard's absence. John Golden has been elected treasurer, which position Mr. O'Donnell formerly held.

Marriages.

R. C. Fagan, clerk of the Russell Manufacturing Co., Middletown, Conn., and Miss Jennie M. Williams, formerly teacher in that city, were recently united in marriage.

Mr. Henry Adams, president of the Rockville Warp Mills Co., Rockville, Conn., and Miss Edith Stewart Cowan, of Brooklyn, N. Y.

Mr. Chas. Arthur Rice, assistant superintendent of the Southbridge (Mass.) Printing Works, and Miss Lillian Southard Berlin, of Wilmington, Del.

Deaths.

Lyman W. York, 79, at South Hadley Falls, Mass. Deceased was overseer of weaving in the Glasgow Mill for twenty-five years. He resigned his position with that company in 1879.

Robert Hewett, for many years an employee in the Harmony Mills, Cohoes, N. Y.

Samuel B. Eaton, at Denver, Col. Deceased was for many years foreman of the finishing department for the Boston Mfg. Co., at Waltham, Mass.

Charles F. Perry, the well-known wool merchant in Boston, who has for some years resided at Buenos Ayres, Argentine Republic, died there some weeks ago, and was buried at Newburyport, Mass., July 21.

Col. David R. Kenyon died at his home at Wyoming, R. I., July 21st. He was for a number of years superintendent in the mills of D. L. Aldrich, Hope Valley, R. I., and Plainville, Ct.

Joseph B. Merrow, Pres. of the Merrow Machine Co., Hartford, Conn., died recently at his home in the village of Merrow near Hartford, at the age of 78. Mr. Merrow was born in East Hartford and for many years was a manufacturer of knit goods at Merrow, until the plant was burned some years ago. The Merrow Machine Co., in which his two sons were associated with him, are the well known manufacturers of crochet machines and specialties for the finishing of knit fabrics. Mr. Merrow leaves a wife, two sons and three daughters.

John E. Oats, treasurer of the Charlotte Cotton Mills, died recently at the age of forty-eight.

Peter Grimley died at the residence of his son-in-law, Thomas Reilly, Webster, Mass., aged 77. He was for 36 years night watchman at the Stevens Linen Works, and for 10 years at Chase's mill. He has been on the retired list 10 years.

Wilson Moody, master carpenter at the Lewiston Bleachery & Dye Works 25 years, died recently at his home in Lewiston.

Edward Delabarre, of Conway, Mass., who had been in feeble health for a year or more, died at his residence in Burkeville, July 31. He was not thought to be dangerously ill until about a week before he died. There seemed to be a gradual breaking down of the entire system. Mr. Delabarre was a native of Belgium, and came to this country about 50 years ago, engaging in wool manufacturing in Moosup, Ct., and in Holyoke, Blackstone and Conway. By his exceptional business sagacity and indomitable energy he succeeded in amassing a large fortune, being one of the wealthiest men in Franklin county. He married Miss Maria Louisa Hassell of Dover, Me., who survives him, as do also 10 children, seven sons and three daughters.

Richard Garsed, the veteran manufacturer, died at his home in Frankford, Pa., July 27. Mr. Garsed was born at Swift Place Mills, Yorkshire, England, September 15, 1819. He was a child of one year when his father, John Garsed, with his wife and two daughters, the late Mrs. James Campbell and Mrs. Thomas Broughton, emigrated to America, first locating in Baltimore, but the following year removed to Philadelphia. His father became one of the pioneers in cotton manufacturing, in Pennsylvania. His son Richard, when only eight years of age, with a purpose of making himself thoroughly acquainted with the details of textile manufacturing, entered a mill at

Alizarine Black

(PATENTED)

Distinguished from all other blacks by the acid test . . .

It is an acknowledged fact that woolen goods for men's wear of American manufacture, due to the more general use of Alizarine Dyes (including the Alizarine Black), are faster in color and therefore give better service to the public than the foreign goods. This is of special importance in view of the fact that our climate with the clear skies and bright sunshine is more trying to colors than in England, Germany or France

Wm. Pickhardt & Kuttroff

NEW YORK

New Hope, Bucks county. In 1830 his father removed to Rockdale, where he rented the old fulling mill there and began the manufacture of power looms, and his son accompanied him and became an apprentice to that trade. In 1834 John Garsed rented the old grist mill at Glen Riddle, which he fitted out as a cotton factory, and in partnership with William France and James Roe, carried on the manufacture of cotton goods there for several years, when Mr. Garsed withdrew from the firm and located in Philadelphia, where he continued the same occupation. In 1840 Richard Garsed succeeded to his father's business, and in 1842 in his mills he manufactured damask table and piano covers by power looms, which was the beginning of the weaving by machinery, of those articles in Pennsylvania, and probably in the United States. In 1843 he removed to Frankford, where, in partnership with his brother, John Garsed, he operated the Middlesex Mill in Aaramingo, and the firm soon extended its operations to include spinning cotton and other branches connected with manufacturing that staple. The business prospered and in 1853 to meet the enlarged demand the firm erected the Wingohocking Mills, one of the largest plants in Frankford even at that time, and in connection with it Richard Garsed owned and operated the Frogmore Mills. He was a skilled and educated machinist. He was the inventor of many useful machines used in cotton mills, and before he attained his majority he perfected a contrivance by which he increased the speed of power looms from eighty picks per minute to one hundred and forty in the same period of time. In 1846 he invented the scroll cam, which greatly simplified the power loom, and was universally adapted to the sliding cam loom.

Sea Island Cotton.

The Charleston, S. C., prices for Sea Island cotton are for medium fine, 16 cents; fine, 18 cents; fully fine, 19 to 20 cents; and extra fine, 28 to 33 cents.

—In 1873, it is said, a great crime was committed in demonetizing the silver dollar, which then really had no existence, for from 1792 to 1873 only 8,000,000 silver dollars had been coined by all the mints of the United States, and not a dollar was then in circulation, for the reason that it took 103 cents' worth of silver to make a silver dollar.

—The cotton mills of Japan, 57 in number, during the last half-year have made an average profit of 10 1-2 per cent., allowing for sums added to the reserves.

BUYERS' INDEX

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

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Architects and Mill Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Automatic Boiler Feeds.
D'Este & Seeley Co, 29 Haverhill St, Boston

Balling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark N. J.

Bandings.
See under Yarns.

Belting.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Danforth Belting Co, 221 Chestnut St, Phila, Pa.
Fell, Geo. & Son, Bolton, England.
Standard Mill Supply Co, 77 Exchange Pl Providence, R. I.
Ulmer Leather Co, Norwich, Conn.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Danforth Belting Co, 221 Chestnut St, Philadelphia, Pa.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 73 Pine St, New York.

Bobbins, Spools, Shuttles, Etc.
Standard Mill Supply Co, 77 Exchange Pl Providence, R. I.
Woonsocket Shuttle Co, Woonsocket, R. I.

Boiler Compounds.
Imperial Chemical Co, 432 Market St, Phila, Pa.
Lord, G. W, 316 Union St, Phila, Pa.

Boxes, Paper.
Palmer, J. S, 35 Wistar St, Germantown, Pa.

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.
Thompson, Snow & Co, Greenfield, Mass.

Braids.
See Tapes and Braids.

Braiding Machines.
Thun & Janssen, Reading, Pa.

Burr Pickers.
Atlas Mfg. Co., Newark, N. J.
Curtis & Marble Machine Co., Worcester, Mass.
Sargent's, C. G . Sons, Graniteville, Mass.

Business and Financial Brokers.
Riggs & Company, 573 Bourse, Philadelphia.

Card Clothing.
Ashworth, Elijah, Fall River, Mass.
Farnsworth Card Clothing Co., Pittsfield, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Card Feeds.
Atlas Mfg. Co , Newark, N. J.
Kitson Machine Co, Lowell, Mass.
Tindell, Henry, 15 Grant Ave., Harrison, N. J.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Calico Printers' Machinery and Supplies.
New Bedford Copper Co, New Bedford, Mass.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals.
De Ronde, A, & Co, 254 Front St, New York.
Roessler & Hasslacher Chemical Co, 73 Pine St, New York.

Chemist.
Huntington, Dr. H, 159 Front St, New York.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Copper Print Rollers.
New Bedford Copper Co, New Bedford, Mass.

Copper Work for Dyers.
Brabender, Chas, Sr, Paterson, N. J.
Oat, Jos. & Sons, 232 Quarry St, Phila, Pa.

Cotton Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Ashworth, Elijah, Fall River, Mass.
Atherton Machine Co, Lowell, Mass.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Kitson Machine Co, Lowell, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
McKerrow & Bennett, 31 State St, Boston, Mass.
Mason Machine Works, Taunton, Mass.
Saco Water Power Machine Shop, Biddeford, Me.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Thun & Janssen, Reading, Pa.
Townsend, Thomas, 157 Orange St., Providence, R. I.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Cotton Openers and Lappers.
Atherton Machine Co, Lowell, Mass.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kitson Machine Co, Lowell, Mass.
McKerrow & Bennett, 31 State St, Boston, Mass.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.

Damper Regulators.
D'Este & Seeley Co. (Curtis), 29 Haverhill St, Boston, Mass.

Designers.
Fresnel, Gustave, 125 W. 56th St, N. Y.
Hand, F, & Co, Paterson, N. J.

Dryers.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.
See Wool and Waste Dusters.

Dyeing, Bleaching and Finishing.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Kensington Dye Works, Kensington, Pa.
Warren, W, Thread Works, Westfield, Mass.
Webster Job Dye Works, Webster, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.
Birch Bros., Somerville, Mass.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln & Co, 54 Arch St, Hartford, Ct.
Parks & Woolson Machine Co, Springfield, Vt.
Phenix Iron Foundry, Providence, R. I.
Rockwell, W. S. & Co, 26 Cortlandt St, N. Y.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Ashley, T. C, & Co, 145 Milk St, Boston.
Atteaux, F. E, & Co, 172 Purchase St, Boston, Mass.
Beach & Co, Hartford, Ct.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Corey, S. J, 273 Congress St, Boston.
De Ronde, A, & Co, 254 Front St, New York.
Farbenfabriken of Elberfeld Co, 77 William St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Hanna-Schoellkopf Co, Philadelphia, Pa.
Harway Dyewood & Extract Mfg. Co, 184 Front St, N. Y.
Holliday, Read, & Sons, 109 William St., New York.
Innis & Co, 120 William St, New York.
Jaeck Bros, J, 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Kalle & Co., 77 John St., N. Y.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 79 Murray St., N. Y.
Matheson, W. J, & Co, 178 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
Nashoba Co, Ayer, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Phillips (Moro) Chemical Co, 131 S. 3d St, Phila., Pa.
Pickhardt & Kuttroff, New York.
Polhemus, Henry, 66 Maiden Lane, N. Y.
Roessler & Hasslacher Chemical Co, 73 Pine St, New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 157 Maiden Lane, N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.

Dyers and Finishers.
Bay State Dyeing & Finishing Co, North Andover Depot, Mass.
Boston Finishing Works, Williamstown Mass.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Kensington Dye Works, Kensington, Pa.
Oakdale Dye Works, 913 W. York St, Phila, Pa.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass.

Dyers' Clogs.
Wildman, Jos, & Co, 1908 N. Front St, Phila.

Edgings.
See Tapes, Braids and Edgings.

Electrotyping and Printing.
J. J. Ryder & Co, 210 Westminster St, Providence, R. I.
Whitcomb, H. C, & Co, Boston.

Elevators.
Cohoes Foundry & Machine Co, Cohoes, N.Y.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Salem Foundry & Machine Shop, Salem, Mass.

Engineers, Electrical.
Smeallie Bros, Amsterdam, N. Y.

Engineers, Mechanical.
Berlin Iron Bridge Co, E. Berlin, Ct.
Ferguson, John W, Paterson, N. J.
Smeallie Bros, Amsterdam, N. Y.

Engraving on Wood.
Ryder Co, J. J, 210 Westminster St, Providence, R. I.

Express Money Orders and Travelers' Cheques.
American Express Co, offices in every city

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.
Smeallie Bros, Amsterdam, N. Y.

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River. Mass.

Fuel Oil Furnaces.
Rockwell, W. S, & Co, 27 Cortland St, N. Y.

Fulling Mills for Woolen Goods.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Singeing Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Rockwell, W. S. & Co, 26 Cortlandt St, N. Y.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Index.
Burr Index Co, 336 Asylum St, Hartford, Conn.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Byram, F. A, Germantown, Pa.

Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Friedberger, Edgings, Germantown, Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, 2632 Mascher St, Phila.
Weimar Bros, cor. Hope and Huntingdon Sts, Philadelphia.

Knit Goods Finishing Machines, Crochet, Etc.

Champion Sewing Machine Co, 1819 N. 5th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Musgrove, Chas. M, Pittsfield, Mass.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Von Buchwald, W. C, 120 N. 7th St, Philadelphia, Pa.

Knit Goods Brushers.

Ardrey, S. B, & Sons, Bristol, Pa.
Jones, Lewis, Philodelphia, Pa.
Musgrove, Chas. M, Pittsfield, Mass.

Knitting Machine Cylinders.

Ashman, Stephen A, 3 Fetter Lane, Phila, Pa.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford, W, & Co, Little Falls, N. Y.
Stanton & Lewis, 318 Branch St, Phila, Pa.

Knitting Machinery.

Bohm, Albert, Agt. for R. Stahl, Germany, 114 Nassau St, New York.
Boss Knitting Machine Co, 7th and Walnut Sts, Reading, Pa.
Brinton, H, & Co, 213 Race St, Phila, Pa.
Campbell & Clute, Cohoes, N. Y.
Champion Sewing Machine Co, N. W., cor. American and Diamond Sts, Phila, Pa.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Co, South Bethlehem, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
National Automatic Knitter Co, Cherry St, Philadelphia, Pa.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Payne, G. W. & Co, Pawtucket, R. I. (Winders.)
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.
Standard Machine Co., 508 Minor St., Philadelphia, Pa.
Taylor, James, 835 Arch St. Phila, Pa.
Union Raveller Co, Troy, N. Y.

Knitting Needles.

Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Lydall, H, & Foulds, Manchester, Conn.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Stoops, H. R, & Co, 66 So. 4th St, Phila, Pa.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.

Bullock & Crenshaw, 528 Arch St Phila, Pa.

Looms.

Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St, Phila., Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Loom Picker Manufacturers.

Crompton & Knowles Loom Works, Worcester, Mass.
Loom Picker Co, Biddeford, Me.

Lubricators.

Dixon, Jos, Crucible Co, Jersey City, N. J.

Lumber.

Stearns, A. T, Lumber Co, Neponset, Mass

Lumpers.

Gerry, George, & Son, Athol, Mass.

Machinery Dealers.

Schofield, Geo. L, 123 N. Front St, Phila,
Scott, James, 123 No. Front St, Phila, Pa.

Machinists' Tools.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.

Walder, J, Paterson, N. J.

Measuring and Folding Machines.

Curtis & Marble Machine Co, Worcester, Ms
Elliott & Hall, 54½ Harmon St, Worcester Mass.

Mill Builders and Engineers.

Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Mill Supplies.

American Supply Co, Providence, R. I.
Ashoff, Charles, 191 Berks St, Phila, Pa.
Bamford & Smith, Pascoag, R. I.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Hill, Jas, Mfg. Co, Providence, R. I.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.
Standard Mill Supply Co, 77 Exchange Pl, Providence, R. I.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg. Co, Leicester, Mass.

Napping Machines.

American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Musgrove, Chas. M, Pittsfield, Mass.
Parks & Woolson Machine Co, Springfield, Vt.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Oilless Bearings.

N. American Metalline Co, 62 W. Ave. and 3rd St, Long Island City, N. Y.

Oil Filters.

Burt Mfg. Co, Akron, Ohio.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Paints.

American Fire Resisting Paint Co, 17 Broadway, New York.
Devoe & Reynolds, Fulton and Williams St, New York.

Pantagraphs for Mill Engraving.

Johnson, C. A, & Co, 22 Dey St, New York.

Patent Solicitors.

Crosby & Gregory, 34 School St, Boston, Mass.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Penstocks.

Dalrymple, George, Fair Haven, Vt.

Peroxide of Sodium.

Roessler & Hasslacher Chemical Co., 73 Pine St, New York.

Picker Sticks.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A, 54 Warren St, New York.
Keasby & Mattison Co. Ambler, Pa.
Nightingale, S. C, & Childs, Atlantic Ave, Boston, Mass.

Pneumatic Conveying.
See Ventilating.

Power Transmitting Machinery.
Fairmount Machine Works, 23d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.
Smeallie Bros, Amsterdam, N. Y.

Presses.
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressure Regulators for Steam and Water.
D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass.

Printers and Embossers.
Novelty Textile Printing Co, 525 W. 24th St, New York.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Smeallie Bros, Amsterdam, N. Y.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Gowdey, J. A, & Co, Providence, R. I.
John Whitaker Reed Co, 194 Front St., Worcester, Mass.
Loom Picker Co, Biddeford, Me.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roller Skins.
Fell, Geo, & Son, Bolton, England.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Warren Chemical & Mfg. Co, 45 Fulton St, New York.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.
Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Saddles, Stirrups and Levers.
Dixon Lubricating Saddle Co, Bristol, R. I.

Sample Cutters.
Gleason, A. H, Rockbottom, Mass.

Schools.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass.
Champion Sewing Machine Co, N. W. cor American and Diamond Sts, Phila, Pa
Curtis & Marble Machine Co, Worcester, Mass.
Dinsmore Mfg. Co, Salem, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Stoops, H. R, & Co, 66 No. 4th St, Phila, Pa.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Crompton & Knowles Loom Works, Worcester, Mass.

Singe Plates.
New Bedford Copper Co, New Bedford, Ms.

Sizing.
American Glutrose Co. Penn Mutual Bldg, Phila, Pa.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.

Soaps.
American Soap & Washolene Co, Cohoes, N. Y.
Holbrook Mfg. Co., 466 Washington St., N. Y.
India Alkali Works, Boston.

Spindles.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Rings.
Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinners' Supplies.
Dixon Lubricating Saddle Co, Bristol, R. I.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Damper Regulators.
D'Este & Seeley Co, 29 Haverill St, Boston Mass.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Reutschler Co, Hamilton, O.
Newburgh Ice Machine & Engine Co, Newburgh, N. Y.
Toomey, Frank, 131 N. 3d St, Phila, Pa.

Steam Separators.
D'Este & Seeley Co. (Curtis), 29 Haverill St., Boston.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Specialties.
D'Este & Seeley Co, 29 Haverhill St, Boston.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Traps.
D'Este & Seeley Co. (Curtis) 29 Haverhill

St, Boston, Mass. (return float and expansion).
Haines, W. S, 132 So. 4th St, Phila, Pa.

Tanks, Tubs and Vats.

Brabender, Chas, Sr, Paterson, N. J.
Corcoran, A. J, 11 John St, N. Y.
Cypress Lumber Co, Apalachicola, Fla.
Hall, Amos H, No. 2nd above Cambria, Phila, Pa.
Oat, Jos, & Sons, 232 Quarry St, Phila, Pa.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.

Fleming & Chapin, 215 Church St, Phila, Pa.
Friedberger & Co, Germantown, Pa.
Kenyon, John J, Pawtucket, R. I.
Perseverance Mills, 2632-40 Mascher St Phila, Pa.
Weimar Bros, cor. Hope and Huntington Sts, Philadelphia.
Witter, H. M. & Co, Worcester, Mass.

Teasels.

Kellogg, Thos. C, Skaneateles, N. Y.
Kellogg, Wm, W, Skaneateles, N. Y.
McLaughlin Bros, Skaneateles Falls, N. Y.

Temperature Regulators.

D'Este & Seeley Co, 29 Haverhill St, Boston.
Haines, W. S, 132 So. 4th St, Phila, Pa.

Tentering Machines.

See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.

N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.

Howard, Geo. C., 1783 Barker St., Phila., Pa

Traveler's Cheques.

American Express Company.

Turbines.

Burnham Bros, York, Pa.
Christiana Machine Co, Christiana, Pa.
James Leffel & Co, Springfield, Ohio

Valves.

D'Este & Seeley Co, 29 Haverhill St, Boston Mass.

Ventilating Apparatus.

Berry, A. Hun, 23 W. 1st St, Boston, Mass.
New England Heating & Ventilating Co Providence, R. I.
Pancoast Ventilator Co, Phila, Pa.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.
Van Noorden & Co, Harrison Ave, Boston, Mass.

Washers (Cloth).

Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.

Watchman's Clock.

Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116 Chambers St, New York.

Water Pressure Regulators.

D'Este & Seeley Co, 29 Haverhill St, Boston.

Water Wheels.

Bradway, C. P, West Stafford, Conn.
Christiana Machine Co, Christiana, Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.

Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.
Replogle Governor Works, Akron, Ohio.

Winders. (Hosiery.)

Payne, G. W. & Co, Pawtucket, R. I.
Universal Winding Co, 226 Devonshire St, Boston.

Wool.

Lyon, John H, & Co, 12 Reade St, N. Y.
Webb, Chas. J. & Co, 156 N. Front St. Phila, Pa.

Wool Cleaning Compound.

India Alkali Works, Boston.

Wool Combing Machinery.

Crabb, Wm, & Co, Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Townsend, Thomas, 157 Orange St, Providence, R. I.

Wool Extracts.

Daly, Jas. E., Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Muhlhauser, F, Co, Cleveland, Ohio.
Sullivan, R. T, 155 Federal St, Boston, Mass.

Wool and Waste Dusters.

Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen Machinery.

Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
Atlas Mfg. Co., Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 23d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kitson Machine Co, Lowell, Mass.
McKerrow & Bennett, 31 State St, Boston, Mass.
Payne, G. W. & Co, Pawtucket, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Thun & Janssen, Reading, Pa.
White, John F, 38 River St, Providence, R. I.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Wool, Hair and Noils.

Fowles & Co, 102 Church St, Phila.
Lyon, John H, & Co, 12 Reade St, N. Y.
Muhlhauser, F, Co, Cleveland, Ohio.
Webb, Chas. J, & Co, 156 N. Front St, Phila Pa.

Wool Shoddies.

Bowers', James, Sons, Ltd, Chester, Pa.
Daly, James E, Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.
Muhlhauser, F, Co, Cleveland, Ohio.
Riverdale Woolen Co, Riverdale, Northbridge, Mass.

Wool Sorters and Scourers.

Duross, Theodore A, Kensington Ave. and Huntingdon St, Phila.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.

Wool Washing, Preparing and Drying Machinery.

Kitson Machine Co, Lowell, Mass.
Sargent's, C. G, Sons, Graniteville, Mass.

Yarns, Threads, Etc.

Banding.

Kenyon, John J, Pawtucket, R. I.
Moore, C. & Co. 12 S. 5th St, Phila, Pa
Warren, W, Thread Works, Westfield, Mass
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
White, James F, & Co, N. Y. and Phila, Pa.
Whittier Cotton Mills, Lowell, Mass.

Carpet Yarns.

Fleming & Chapin, 215 Church St, Phila, Pa.

Cotton Yarns.

Catlin & Co, New York and Boston.

Dana Warp Mill, Westbrook, Me.
Eichman & Sternberg, 488 Broadway, N. Y.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Tucker & Cook Mfg. Co, Conway, Mass.

Cotton Warps and Yarns.

Abegg & Rusch, 92 Grand St, N. Y.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Germantown Spinning Co, Germantown Pa.
Globe Yarn Mills, Fall River, Mass.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York City.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Montgomery, J. R, Co, Windsor Locks, Ct.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co., 86-88 Franklin St.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.
King, Alex, & Co, 54 Leonard St, New York.

Glazed Yarns.

Blodgett & Orswell, Pawtucket, R. I.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Kenyon, John J, Pawtucket, R. I.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Hadley Co, 95 Milk St, Boston, Mass.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Moore, C, & Co, 12 S. 5th St, Pilha, Pa.
Warren, W, Thread Works, Lowell, Mass.
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Abegg & Rusch, 92 Grand St, New York.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Clark, Wm. Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
Cohannet Mills, Taunton, Mass.
Croll, Albert Ivins, Boston, Mass.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Germantown Spinning Co, Germantown, Pa.
Globe Yarn Mills, Fall River, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Holland & Webb, 487 Broadway, N. Y.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York.
Mitchell, James E, & Co, Phila. and Boston.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Porter Bros, 78 Worth St, New York.
Rockwell, E. M, Leominster, Mass.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86-88 Franklin St, N. Y.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Trenton Worsted Mills, Trenton, N. J.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Lowell, Mass.
Whittier Cotton Mills, Lowell, Mass.

Jute Yarns.

Eichman & Sternberg, 488 Broadway, N. Y.

Mohair Yarns.

Abegg & Rusch, 92 Grand St, New York.
Eichman & Sternberg, 488 Broadway, N. Y
Holland & Webb, New York.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Cranston Worsted Mills, Bristol, R. I.
Eichman & Sternberg, 488 Broadway, N. Y.
Holland & Webb, New York.
Malcolm Mills Co, 216 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Ramie.

Holland & Webb, New York.

Silk Noils and Yarns.

Skerry, A. T, 47 Leonard St, New York.

Silk Yarns.

Cheney Bros, S. Manchester and Hartford Ct.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Spun Silk Yarns.

Champlain Silk Mills, Whitehall, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Porter Bros, 78 Worth St, New York.
River Spinning Co, Woonsocket, R. I.
Rockwell, Edward M, Leominster, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Abegg & Rusch, 92 Grand St, N. Y.
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Botany Worsted Mills, Passaic, N. J.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson St, Camden, N. J.
Eichman & Sternberg, 488 Broadway, N. Y.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Porter Bros, 78 Worth St, New York.
Sawyer, Manning & Co., 86-88 Franklin St, N. Y.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

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IT PAYS to consult our CATALOG when in need of Oil Extractors, Steam Separators, Engine Indicators, Exhaust Heads, Feed Water Heaters, Oil Filters. It is yours for the asking.

JAS. L. ROBERTSON & SONS,

204 Fulton St., New York. 12 Pearl St., Boston.

SITUATIONS WANTED.

The advertisers in the following columns should be addressed in care of TEXTILE WORLD, or inquiries concerning them may be addressed directly to "Information Department, TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

WOOLEN SUPERINTENDENTS.

1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

1170 **Woolen Superintendent** wants a position as superintendent and designer of a small mill, or superintendent of a large mill. Age 54; marrried. Don't want a position in any of the Southern or Western states. Has worked on a great variety of goods, and can refer to reliable parties.

1159 **Woolen Superintendent.** A first class man on carriage robes, furniture plush, bed and horse blankets. Has excellent references. Has held present position as superintendent for several years; good reasons for desiring a change. Age 39; married.

1255 **Felts.** The advertiser has a thorough, practical knowledge of all the details connected with the manufacture of paper makers' felts and jackets; especially adapted for fast running machines; good reason why he is now in the market; recommended by past employers.

1250 **Superintendent,** or would accept a position as designer in a good woolen mill. Understands fancy cassimeres, cloakings, dress goods, kerseys, unions and worsteds. Can produce the Jacquard effect on an ordinary cotton, Knowles loom. Refers to good mills.

1239 **A man who understands the** manufacturing of woolens in all the details, is open for an offer. Is an experienced manager, and is at present in charge of a mill that is being run at a profit.

1227 **A Superintendent** with a thorough practical training in all the departments of a woolen mill making worsted cassimeres, dress goods, cloakings, overcoatings, robes, blankets, shawls, etc. Has a thorough knowledge of designing and has held position in first class mill, to which he can refer.

1231 **Manufacturer.** One who has had a thorough experience in the management of a mill of his own, and who can show proof as to his ability, is now in the market for a position as superintendent or assistant superintendent with any good company. Age 40; married.

1219 **Superintendent.** A young man who has had a practical experience in every department of a woolen mill, including designing, wishes to secure a position as superintendent, designer or both. Is highly recommended by his present employers for whom he holds a position as overseer. His strong points are on cassimeres, cheviots and Unions.

1208 **Designer or Superintendent.** Graduate of textile school. Experienced in most kinds of woolens. During the eight years very successful on fancy worsteds and cassimeres, also overcoatings. 35 years of age and married. The best of references as to ability and character.

1222 **Superintendent, Designer and** Weaver. Wants a position in woolen or worsted mill. Understands the work thoroughly, on a great variety of goods.

COTTON SUPERINTENDENTS.

1265 **Superintendent** wants position as superintendent of cotton cloth mill. Has had charge of each department in the mill; aged 28 years; married.

1266 **Cotton** superintendent wants position. Out on account of mill shutting down. Understands fancy and plain cottons, white and colored. Has a first-class record.

1267 **Cotton** superintendent or carder. Prints, sheetings, ginghams, fine and coarse, white and colored. Nearly all kinds of machinery. References all right. Age 47; married.

1269 **Cotton** superintendent, carder, spinner and dresser; 43; married. Has held position in some of the best mills; is strictly temperate, and well recommended. Cotton, flannels, ginghams, crochet and Marseilles quilts, etc.

1184 **Cotton Mill Superintendent,** wants position. Age 50; married. Sheetings, shirtings, drills, etc.; also all kinds of yarns and yarn dyeing. Has good references. Superintendent eighteen years at one mill.

1236 **Superintendent** of cotton mill desires to change positions. Is thoroughly competent, steady and reliable. Good mechanic and a good manager. Has push and executive ability. Over 15 years experience, and fully understands how to keep production right as to quality, quantity and lowest cost. Best system of economy maintained. First class references can be given.

WOOLEN CARDERS.

1249 **Carder and Spinner,** woolen, wants position. Familiar with a great variety of goods. 37 and married.

1248 **Carder,** woolen. Age 37 years; married. 10 years with one of the best mills in New England. Dress goods, beavers, blankets, cotton warp hair lines and kerseys.

1230 **Superintendent or Carder and** spinner wants position in woolen mill. Age 30; married. Can take position at once. Familiar with jeans, cassimeres, flannels, knit goods and shoddies.

1233 **Felt** Overseer of Carding. A good man on felt or woolen goods. Aged 35; married. Can refer to past employers.

1082 **Woolen carder experienced on** all classes of underwear. Has worked for eight years in one mill, 29 years of age and married. Good references.

1241 **Woolen Carder.** Age 40; married. Overseer 14 years in one place. Long experience on all-wool, wool and cotton mixed, shoddy, etc. Temperate, and can furnish good references. Prefers Philadelphia.

1197 **Woolen Carder** wants position. Overseer over 16 years in some of the best woolen mills. Accustomed to all kinds of work. Age 50; married. Well recommended.

1190 **Woolen** Carder or Spinner. Age 47; married. One reeler and one piecer in family. Has been overseer and spinner for the last fifteen years for one firm, which is now out of business. Refers to past employers. Can take position at once. Familiar with wool shoddy and cotton; Furbush, Lee and other makes of machinery.

1153 **Comber.** Understands repairing and running combers, speeders and cards. Overseer seven years in one of England's fine mills, on counts ranging from 120s to 150s. Will accept a position as overseer or 2d hand. Refers to responsible parties as to ability and character.

1270 **A 1 Carder,** wool or cotton, 11 years experience, first-class references, reliable, temperate and industrious, desires immediate position. Age 30. Will go any where.

COTTON CARDERS.

1138 Second hand of cotton carding wants position. Has had a good experience in that position. References.

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

922 **Cotton** Carder. Age 47 years. White or colored work. A thorough carder and a reliable man.

910 **Overseer** of cotton carding. Good man on white or colored yarns, for plain or fancy work. Age 42; married.

502 **A First** class cotton carder and spinner is open for an engagement. References are of the best

1138 **Second Hand** of cotton carding wants position. Has had a good experience in that position.

1260 **Carder.** Wants position as overseer on fine goods, or coarse; age 27.

910 **Is a good carder** on plain, colored and fancy white stock. Age 41. $2.50 and up.

WOOLEN SPINNERS.

1223 **Wants position as Overseer of** Spinning or Twisting, or both. Familiar with fine or coarse numbers. Refers to past and present employers.

1195 **Spinner, Woolen.** American; age 31; married. Experienced on yarns from 1 to 7 1-2 run. Refers to past and present employers. Wants position as overseer. Will not go to Southern States, Canada or Connecticut. Is an experienced overseer.

1152 **Woolen Spinner** wants position as overseer or 2d hand, in Southern or Western States, or Pennsylvania. Age 20; single. Understands Johnson & Bassett operators and mules. Has worked on a variety of goods. Good recommendations as to character and ability.

1112 **Overseer of Woolen Spinning** wants position. Has first-class references. Age 37. Wages reasonable. Will accept second hand's position.

1246 **Spinner,** woolen. Wool and shoddy from 1-2 to 10 run, cassimeres, flannels, dress goods, underwear and blankets. Davis & Furber, Furbush & Sons, Johnson & Basset, and Schmidt machinery. Good references.

COTTON SPINNERS.

1272 **Second Hand** of cotton ring spinning wants position in Massachusetts, Rhode Island, Maine or New York. Age 23; married.

1280 **Wanted, situation** as overseer or second hand of mule spinning by a thorough, practical man. Good references from past and present employers. Understands all English makes of mules. Will go South or Canada

1176 **Ring Spinner, Overseer** wants position on medium, fine or coarse spun yarns; age 38; married. Can take position at once. Can furnish satisfactory references from past and present employers. Good reasons for wishing to make a change.

1189 **Spinner, Cotton, Mule or Ring.** Age 38; married. Ginghams, dress goods, flannels and hosiery yarns. English or American make of machinery. References if desired. Don't want a position in Maine, Canada or any Western state.

1198 **Cotton Spinner,** spooling, warping, slashing, web drawing, skein winding and quilting on linen. Well recommended. Age 42; married. Has worked in some of the best mills. Will go anywhere. Would accept a good second hand's position.

1187 **Overseer of Dressing** or spinning wants a position in a cotton mill. Is an A1 man on colored or white goods, and understands slashing and beaming thoroughly. American; age 38; married. Has had charge in some of the best mills of New England. Sheetings, shirtings, dress goods, cheviots, flannels and sateens. Familiar with Mason, Whitin and Lowell machinery.

1243 **Mule** spinner; cotton. Age 36; married. Prefers New York or Massachusetts; references.

1158 **Overseer of Ring Spinning,** spooling, warping and slashing wants position on white work, fine or coarse. Age 46; single. Will go anywhere. Good references. Familiar with Mason, Bedford, Lowell and Fales & Jencks machinery.

WOOLEN WEAVERS.

1008 **Wants boss job in flannel mill.** Northern New England preferred, also a good man for dresser or fixer, has worked on flannels, serges, cheviots, fancy dress goods. Is 34, married.

1216 **Weaving and Dressing.** Man wants position as overseer of weaving or dressing, or both, in some good woolen mill. Has had 16 years' experience. Can pick patterns and figure yarns. Has references.

1253 **Weaver, Designer or Superintendent** Open for a position. Refers to past and present employers. Aged 47; married. Worsted cloakings, cassimeres and dress goods.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1273 **Woolen** weaver wants position. Age 35; married. A first class man.

COTTON WEAVERS.

1242 **Overseer Cotton Weaving.** Familiar with plain cloths, sateens, fancy checks and stripes, box looms and dobbies. References. Age 43; married. One weaver, one twister in family.

1235 **Cotton** man wants position as overseer of cotton weaving. Prints, twills, satins, denims, cheviots, lenoes, etc. Crompton, Knowles, Lowell, Whiting and English looms.

1110 **Overseer of Cotton Weaving,** fancy or plain. Age 42; German. Wants position as overseer, or will take second hand's position. Has had charge where first-class goods are made. Good references.

1261 **Weaver.** Cotton, woolen, ramie and silk goods. Good experience in first-class mills.

176 **Wanted** a situation as cotton weaver or as superintendent; am a strictly temperate man; married; 40 years old; am a practical man and a pusher. Will go anywhere, and at any price to suit the times. Will guarantee satisfaction in every respect. Now employed. Correspondence invited. Can furnish good references if required.

1247 **Elastic** weaver wants position as overseer. Used to cotton web, elastic suspenders, silk neckwear, dress goods and handkerchiefs. 28.

176 **Wanted.** A position as overseer of weaving, second hand or loom fixer, either in a cotton, woolen or jute bagging mill, by a faithful, sober, steady man, fully capable in either of the above positions. References furnished as to character and experience.

1127 **Overseer of Weaving.** French. Age 36; married. Understands sheetings, drills and prints. Will go anywhere. Out of work; mill stopped. Refers to past employers.

FINISHERS.

1041 **Woolen Finisher.** Has had experience on fancy and piece dyed goods, cassmeretes, cheviots, worsteds, kerseys and dress goods. Wants position as overseer or second hand in New England States. Age 26 years. Will work for $2 50 per day.

1207 **Woolen or worsted** finisher wants position as 2nd hand in some first-class mill. Has had a good experience as 2nd hand, and refers to past and present employers; age 28. Especially strong on Scotch tweeds, dress goods and fancy cassimeres. Familiar with English and American machinery.

1214 **Woolen and Worsted Finisher.** A first class man. One that has had a thorough experience in one of the best mills in New England.

228 **Is an A1 Woolen Finisher.** Age 36; married. Has been employed in two of the very best mills in New England, and refers to them as to character and ability.

1251 **Finisher,** woolen. Aged 29; married. Experienced on all classes of goods. Has had charge of finishing in a first class mill the past five years. References O K.

DYERS.

1278 **Dyer.** Woolen cassimeres, cheviots, meltons, overcoatings, kerseys, dress goods, shawls, Government blues.

1264 **Dyer** on cassimeres, chinchillas, kerseys, frieze, cloakings, piece dyes, raw wool, raw cotton, cotton yarns and plushes; 43; married. Fair pay. References.

1165 **Dyer,** wants position on cotton goods, ginghams, stripes, and cotton goods in general, long and short chain. Understands sizing. Southern states or Canada preferred. Now in the South. Age 37; married.

1234 **Dyer,** woolen. Aged 27; married. Strictly temperate. Out of a position through causes over which he had no control. Is recommended by some of the solid men. Wool slubbing, skein and piece goods, also indigo vats.

1217 **Woolen Dyer,** wants position as boss dyer on beavers, kerseys, dress goods, cloakings, piece dyes, worsted yarns, both with machine and hand dyeing. Also wool in fancy colors.

1218 **Dyer of Fast Colors.** On wool and worsted in the stock, slub, yarn and piece, and who is a graduate chemist of the Massachusetts Institute of Technology. Wants a situation.

1201 **Wants** position in laboratory manufacturing, house or mills, or would accept a position as second hand of dyeing. Age 28; single. Has been employed by two of the best houses in the country. Can take position at once. Western and Southern States barred out.

1188 **Dyer** on cotton yarn or thread. Age 28; married. Will not go South or to Canada. References if required. Six years' experience as second hand in a first class thread mill.

1194 **Dyer, Woolen;** age 32; married. Has held position as assistant dyer and overseer of dyeing. Refers to present employer; good reason for changing. Could take position on one week's notice; worsted yarns, wool in stock and piece dyes.

KNITTERS.

1224 **Knit.** Superintendent. Understands all makes of machines; silk, wool, merino, worsted, lisle and cotton goods. References all right. Age 35 years.

1066 **Knitter.** Age 25; single; underwear, cotton and worsted; references.

1274 **Hosiery** superintendent wants position; married. Long experience on men's, women's and children's woolen hosiery.

887 **Superintendent.** Is a practical mill man with 20 year's experience in carding, spooling and knitting. Age 35. Now employed in one of the best mills in New England.

1257 Superintendent of knitting mill wants position; is a finisher and understands every part of the business, including shipping all kinds of goods, fabrics, cotton, worsteds, silks, wool on all kinds of shapes, and flat goods; most all kinds of knitting machinery and finishing machinery; age 32; married; refers to past record.

1163 **Knit.** Good man for hosiery mill; understands buying, selling and finishing. Has had first class experience, and can furnish first-class references. Would accept position as travelling sales man.

1164 **Wants Position** as superintendent of hosiery mill, or overseer of woolen carding and spinning. 35 years of age; 9 workers in family. Has good references, and has had a good experience. For further information address No. 1164, care Guild & Lord.

1173 **Wants Position** as overseer of knitting department. Understands all kinds of machines; plush work, vertical stripes, full fashioned flat cuff, rib knitting, etc. Refers to good people who have known him for 28 years, and others; age 38, married.

DESIGNERS.

1275 **Designer** or assistant. Age 25; married. A good man on cotton or worsted fancy dress goods. Jacquard and box looms.

1245 **Designer,** or superintendent and designer. Thoroughly experienced as superintendent and designer. References all right. Familiar with a great variety of goods.

1263 **Assistant** Designer or Assistant Superintendent. Has received a practical mill experience, and is a graduate of the Philadelphia Textile School. Unions, cassimeres, suiting, cloakings. Age 24 years.

1259 **Color Designer** or Woolen Superintendent. Age 39. Good, steady reliable man. Refers to past employers.

1252 **Designer, Weaver or Dresser.** Aged 40 years; married. Familiar with nearly all kinds of men's wear, piece dyes, etc. Refers to past and present employers.

1174 **Woolen Superintendent** wants a position as superintendent, designer or weaver. Age 47; married. Crompton or Knowles looms, cheviots, suitings, tricots and face goods. Don't want a position in Canada. Good references.

MISCELLANEOUS.

1202 **Silk Superintendent** is open for an engagement with a first-class company. Has a thorough knowledge of all the details connected with the manufacturing of silk ribbons and hat bands, from throwing to the finished product. Has held the position of superintendent of a first-class mill for several years. Under 30 years of age, and married. Has the best of references. For any further information address this paper.

1271 **Engineer.** Position wanted by a young man with a second class license, as engineer or mechanic. Is a reliable man. Age 21.

1141 **Overseer of Wool Sorting** wants position. Understands sorting and grading in all its branches; 20 years experience as boss sorter. Can give the best of references from past and present employers. Is a good judge of the shrinkage of wool, and understands the selection of wool in market for mill. Has six workers in family.

1157 Wants position. Has a general knowledge of all departments in a cotton mill, and can fill most any position. Has highest of references; age 26, married.

1209 **Book-keeper** is open for an engagement. Will accept a position in any State. Could take a position at once. Has first-class references.

1156 **2nd Hand of Dyeing** or overseer of washing and bleaching wants position. Familiar with knit goods, wool. Age 33. Don't want a position in Canada or the Western or Southern states. Can take position at once; good references.

1162 **Good Man for Beaming Department.** On heavy sized, plain calicoes and colored cotton goods, twills and sheetings. Will go anywhere. Age 33; married. Good references.

1175 **Finisher or Dyer,** woolen goods, wants position in Western or Southern States; cassimeres, blankets, dress goods, etc. Refers to mills in which he has held position as overseer; age 43; married. References are good.

1229 **Dresser.** Overseer of woolen dressing. Age 30. Men's wear and dress goods. Good references.

1228 **Shearer.** Wants position as overseer of shearing. Good man on cassimeres, worsteds, unions and cheviots. Age 25; married. References.

1192 **Worsted Steam Dresser** wants position as overseer. Has worked in some of the best mills in England and America. Has high references; age 36; married. Has a thorough knowledge of both plain and fancy work.

1087 **Overseer of Beaming, Designing or Weaving.** 35 years of age. Married. Has worked on dress goods, silk striped shirtings, pantaloon goods, ginghams, etc. Highly recommended. Will go anywhere in the United States.

1151 **Asst. Superintendent or Designer** wants position. Age 33; married. Worked on cloakings, fancy worsteds, cheviots, dress goods and cassimeres. Can refer to past employers.

1137 **A Salesman for an Underwear** Mill. Would prefer the account of some large underwear mill exclusively. Salary or commission. Is an experienced salesman and with 9 years practice in the manufacture of knit underwear.

AMERICAN SPINNERS'

Cotton Yarn Exchange.

COMBED AND CARDED COTTON YARNS.

ARNOLD B. SANFORD, - MFRS. AGENT,

226 Devonshire Street.

BOSTON - - - - MASS.

TINDELL CARD FEED

For Feeding Wool, Hosiery, and Shoddy Cards.
Simple, Accurate and Well Built.
Improved in every respect and ready for the Market.

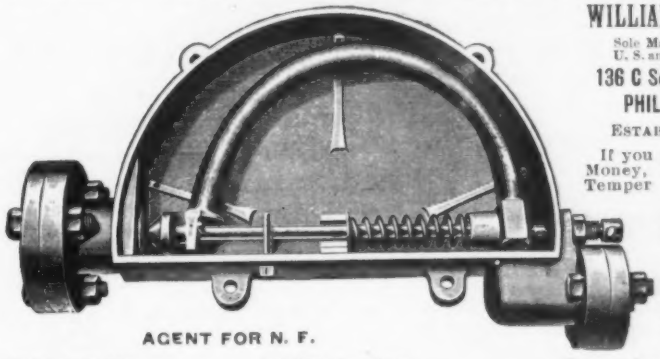
Illustrated circular of Card Feed, and Free Sample of Tindell's Patented Metallic Links for Feed and Hopper Aprons, Covers, etc., on application.

I have substituted a reciprocating comb and a spiked apron with metallic links in place of a revolving doffer, for keeping the stock back; this makes a swinging or rocking back, designed to prevent sorting of stock once in the receiver, and, **is a principle which alone places this Feed ahead of all others.** It prevents rolling and sorting, the result being even feeding. The metallic link is also used in place of leather for aprons for cotton openers, lappers, etc.

HENRY TINDELL,

15 GRANT AVENUE, Patentee and Builder. HARRISON, N. J.

THE HEINTZ STEAM SAVER.



AGENT FOR N. F.

CHAS. F. CHASE, - 26 Milk St., Boston.

WILLIAM S. HAINES,

Sole Manufacturer for U. S. and Canada,

136 C South 4th Street, PHILADELPHIA.

ESTABLISHED 1874.

If you want to save Money, Labor, Time, Temper and Trouble, and **increase your output,** you must have the **Heintz.**

The only apparatus in the world that is always worth its original cost.

Do you know of another?

Wanted. First class 30 gauge Rotary Frame; one adapted for plain work with top machines and narrowing tackle. F W. Gorse, Highlandville, Mass.

—The returns to the State House made by corporations in this State are so perfunctory and untrustworthy, that little opinion can be formed of the financial status of those reporting.

—The mordant browns are comparatively numerous. There is Anthracene Brown, Anthracene Acid Brown, Chrome Browns, and a few others. The general characteristics of all these browns is that they produce very fine fast shades, and are applicable to all kinds of textile coloring.

Oil Filters...

We are the largest manufacturers. Our "Cross" Filter has been on the market 7 successful years. Used in 12 countries. Specially adapted to Cotton and Woolen Mills. Capacities 3 to 120 gals. per day. Sent on approval. Reduces oil bills 50%. Interesting reading matter upon request.

The BURT MANUFACTURING CO.
Akron, Ohio, U. S. A.

RIGGS & COMPANY,

(ESTABLISHED IN 1872.)

Business and Financial Brokers.

573-575-577 Bourse, Philadelphia, Pa.

Sell all kinds of legitimate business, negotiate partnerships, procure special capital, sell stocks and bonds of first-class manufacturing and mineral corporations, and act as trustees and transfer agents. Business transacted in all parts of the Union and Canada.

Those writing us for our terms will kindly state amount involved, as they are governed thereby according to a uniform list of rates.

Hosiery Mill For Sale or To Let

A new plant, capacity 100 dozen per day.

Water Power To Let, 400 H. P., with excellent buildings.

W. K. DANA, Westbrook, Maine.

Recent Sales of Mill Shares.

	Lowest.	Highest.
Sagamore	103	104
Stafford	100	107
Shove	105	105
Barnard	88	88
Seaconnet	100	100
Davol	100	100
Amoskeag	1412½	1415
Continental	19	19
Everett	72⅜	72⅜
Lowell	517½	517½
Manchester	98½	98⅝
Boott	1007½	1007½
Lyman	70⅞	70⅞
Border City	118	118

—Japan's weaving industry continues to show signs of expansion. The total number of weaving establishments in 1896, was 660,408, with looms to the number of 949,123, giving employment to 1,042,866 weavers, of whom 57,850 were male, and 985,016 female. The value of the products was:

	Yen.
Silk textiles	46,471,401
Silk and cotton mixture	10,281,272
Cotton fabrics	37,083,757
Hemp manufacturers	2,011,467
Other manufactures	339,338
Total	96,187,235
Equivalent in United States gold dollars (about)	$50,000,000

To Keep in Touch

With the textile manufacturing interests of the South the **MANUFACTURERS' RECORD** is indispensable.

It is recognized as the best authority on all industrial matters, relating to this territory, and maintains a Textile Department, giving in detail the development of this industry — the establishment of new mills, the advantages possessed by the South for cotton manufacturing, and notes of general interest to people in this line.

Subscription Price $4.00 per yr.

As an advertising medium it is the best that can be employed for reaching the mills of the South.

Sample copy will be sent free, and we shall be pleased to give advertising rates on application.

MANUFACTURERS' RECORD,

BALTIMORE, MD.

Knitting Mill Wanted!

The town of Lyndonville, Vermont, has peculiar advantages for a Knitting Mill, viz:

SPLENDID POWER,—Water (850 H.P.), Electric.

BEST HELP (native) at reasonable wages.

GOOD FREIGHT and shipping facilities on B. & M. R. R.

The townspeople are progressive and willing to encourage any legitimate manufacturing enterprise. The town has electric lights and water. It is a fine location for a wood-working establishment. Plenty of hard wood cheap.

Write to the BOARD OF TRADE,
Lyndonville, Vt.

LYNDONVILLE,
VERMONT.

FOR SALE, SECOND-HAND MACHINERY.

Double Corliss Engine, cylinder 25x60 in. Single Corliss Engine, cylinder 20x48 in. Singles Corliss Engine, cylinder 16x36 in. Single Corliss Engine, cylinder 12x24 in. 30-40 50-80 and 100 H. P. Automatic Engines.

Large stock of Plain Slide Valve Engines, Boilers, Steam Pumps, Feed Water Heaters, Lathes, Planers, Shapers, Drill Presses, Milling Machines, Electric Motors and Dynamos, and Wood-working Machines. Let me know your wants as my stock is constantly changing. Yours respectfully, FRANK TOOMEY, 131 No. 3rd St., Philadelphia.

FOR SALE.

New and Second-hand Noble Combs, Gill Boxes, Drawing, Spinning and Twisting Machines. Also 72 in., 85 in., 115 in., Knowles Looms, fitted up for Jacquard work, Cop Winders, Chenille Reels, Chenille Cutters and Tassell Making Machines. All kind of Change Wheels for worsted mills, Belting and Mill Supplies kept in stock. Apply to

EDWARD JEFFERSON & BRO.,

28 Strawberry Street, Philadelphia, Pa.

SOLE AGENTS FOR

J. B. Farrar & Sons, Halifax, England,

Mfrs. Spinning, Drawing, and Twisting Machinery.

$200.00 (Two hundred dollars) will buy a complete, one set, woolen machinery, (second hand), with carding machines and picker. For further information address,

H. B. BORNEMAN,
Portland, North Dakota.

FOR SALE

On easy terms. Five story brick mill, two hours from N. Y. City, in New York state. Communication by three lines of railroad. Track laid to door of mill. 70,000 square feet of floor space. Coal very cheap. Help abundant at low rates. Lot 175 feet front, 139 feet deep; Building 75 feet front, 137 feet deep; Annex 42 feet front; light on all sides. Address, J. B. J., Textile World Office, Boston.

WANTED.

Line of Cotton and Wool Hose, Men's, Women's and Children's; also, Underwear, Men's, Women's and Children's, for Philadelphia, New York and Baltimore Markets.

J. W. B. C., 647 Bourse,
Philadelphia.

Knitting Machinery

FOR SALE.

We wish to sell the following machinery, having made arrangements to have our goods made in a large knitting mill in New York State. We wish to dispose of all our machinery, which has been in use only two months. This machinery was made with special care, as it was intended by the makers to be used as an advertisement for them in this city.

4 McMichael & Wildman Knitters, 8, 10, 11, 12 inch cylinders, 12 needles to inch.

1 Wheeler & Wilson Button-hole machine.

2 Union Button Sewing Machines.

2 Merrow Overseamers, No. 38.

7 Union Special Seamers.

Sewing Machine Tables for 4 sewing machines.

Enquire at Elevator,
120 Kingston St., Boston.
OR WRITE
J. H. FITZPATRICK,
157 Broadway, South Boston.

Capital,
$1,200,000.

100,000 SPINDLES.
Weekly Product 120,000 lbs.
14's to 160's.

HIGH GRADE

Cotton Yarns,

SPECIALLY ADAPTED FOR

Silk, Plush, Upholstery & Hosiery

MANUFACTURERS.

American Peelers. Sea Island. Egyptian Cottons.

Superior Qualities Combed and Carded—Furnished in singles, 2, 3, 4 and 6-ply hain warps, skeins, beams, spools, tubes, cones and Lisle Thread yarns.

Cops for Weaving and Twisting. Cops for Hosiery.

GLOBE YARN MILLS,

Fall River, Mass.

E. B. JENNINGS, - - Treasurer.

Frank A. Stevens, *Pres.* Arthur H. Mason, *Treas*
Capital Stock, $500,000.

Sanford Spinning Co

FALL RIVER, MASS.

30,000 Spindles. Weekly product, 50,000 pounds 14s to 40s.

Novelty Cotton Yarns,

FROM AMERICAN PEELERS AND EGYPTIAN COTTONS.

OUR SPECIALTY: Superior qualities of Hosiery Yarns, Natural Shades of Cottons, and in Colors, Jaegers, Mixes, and Bleached, Hosiery Cops on Long Tubes, Skeins, Tubes, Cones and Lisle Thread Yarns. Furnished in Carded and Combed Qualities in Singles, 2, 3 and 4-plies.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn. Orders for white cop yarn are being placed to some extent at prices ranging from 1 to 1 1-2 cents per pound advance. The firm stand taken by spinners is having a good effect, as the knitters now realize that they cannot any longer make prices at which spinners must sell yarn. Both the Eastern and Southern mills refuse to continue making yarn at a loss. They are all curtailing production, and the prices asked are firmly maintained. Knitters are kicking hard against the advance, and it looks as though some of them who have taken orders without covering for duplicates, for the whole season, are in a bad position. White cop yarn is selling best, in numbers ranging from 9s to 11s. Some of the knitters who are left are trying to buy yarn of the weaving cotton mills. They claim these mills will sell yarn at old prices. We do not take much stock in this statement, because if the mills fitted up for spinning white cop yarn cannot make money at old prices, surely the weavers with machinery not adapted for that class of work, cannot. The buyers of knitted fabrics have not placed orders as yet to any great extent, as they realize that manufacturers must produce garments to sell at what is known as a popular price. If material advances, the manufacturer must still produce at the given price, although it may not be so good.

Colored yarns are selling well in the finer sizes, and to mills manufacturing the fleeced-back underwear, the face being this colored cotton yarn, and the back being either wool or merino yarn. We note a demand for ribbed underwear in silver gray color.

Many orders for Egyptian yarn were placed, in anticipation of a duty of 20 per cent. being placed on cotton, which duty, however, did not materialize. Orders are being placed for immediate delivery in 11s combed Egyptian, and orders are being taken for light weight yarn. Spinners are insisting on advances, ranging from 1 1-2 to 2 1-2 cents per pound, according to the size, and there is no doubt but that the advance will be much more as the season progresses. Spinners say that later a good demand will be had for yarn, and they will not fill up with orders at low prices. For months and months prices of yarns have been crowded down lower and lower until the bottom has been reached, and mills prefer stopping rather than continuing this sort of business. The price on fine combed yarn is only what spinners formerly got for carded work, and is entirely too low, and no man can get out whole, or get a new dollar for an old one.

We are glad to note a much better feeling among manufacturers of all kinds of goods, and good business is surely coming.

Woolen Yarn. Spinners are fairly busy. The advance in wool is interfering with trade, as the majority of these mills have small capital, and have been unable to purchase, in anticipation of the advance. In fact, orders for large amounts of yarn were refused, because of the uncertainty of the wool market. The majority are now desirous of running with stock owned by the manufacturer, weaver or knitter. Knitters requiring yarn have purchased but little yarn in comparison to their consuming capacity in good times. For instance, we know of a large mill whose consuming capacity is about 50,000 pounds per year. They purchased but 15,000

(Continued on page 131.)

Frank E. Patterson, Prest. Oscar W. Wood, Treas

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

GEORGE SHIMER & SON,

Spinners of Worsted Yarn for the Weaving and Knitting Trade.

All kinds of Fancy Yarns for the Knitting Trade.

5th and Erie Sts., Camden, N. J.

WEAVING and HOSIERY YARNS.

We Buy for Cash

WARPS, COPS, TWIST and SOFT SKEINS, Single, Double, 3-ply, 4-ply, etc.

COLORED YARNS for HOSIERY

on Cones, a Specialty.

Correspondence Solicited.

EDWARD S. HYDE, 223 and 225 Chestnut Street, PHILADELPHIA PA.

Glazed, Bleached and Dyed

YARNS

Cone Winding.

W. WARREN THREAD WORKS.

WRITE US
WHAT YOU USE,
WE WILL DO THE REST.

WESTFIELD, - MASS.

YARNS

SOLIS - - BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

(Continued from page 128.)

facturers, now that the tariff is passed, will advance their goods 12 per cent., and on the next season's business the advance will be 37 1-2 per cent. It is the opinion of many that the advance will be even greater, if buyers place orders in large quantities. It may seem strange, but we find that some manufacturers at this writing, after the tariff has passed, are already purchasing Australian lamb's wool for immediate consumption, and at a good advance. It looks as though the new tariff would bring prosperity much quicker than was anticipated. We believe the tariff, as a whole, when fully understood, will give satisfaction to the trade in almost all respects. Wool and yarn are very firm and advancing.

Worsted Yarn. Spinners are running on orders taken the early part of the season. Weavers are running on heavy weight orders, but are cautious about taking orders on light weights. Fancy worsteds will be opened at an advance, on a basis of 95 cents for 2/40s worsted, and $1.05 for 2/50s. The spinners will undoubtedly quote prices to the full extent, based on the cost of yarn, with the 11 cents per pound duty on grease wool. It is but reasonable that this should be done, as no spinner running Australian or delaine wools can replace at old prices. Orders are accepted only for immediate delivery. Holders of wool will make no concessions, and spinners will not, although to get orders spinners with wool purchased may reduce prices slightly later. At this writing the advance asked by spinners cannot be given as a certainty. Yarns have advanced from 44 cents to 56 cents. The first advance was quoted at 10 per cent.; yarns costing 70 cents selling at 77 cents; yarns costing 80 cents now selling at 88 cents. The advance, so far as we know, is to the full extent, 95 pounds yarn, and many others are in the same position. Underwear manu-

(Continued on page 133.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

SAWYER, MANNING & CO.,
YARNS,
86 & 88 Franklin St., NEW YORK

ALEX'R KING & CO.
YARNS.
FINE IMPORTED YARNS A SPECIALTY
54 Leonard St., New York.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
51 & 53 Summer St., Boston.
Cotton, Woolen & Worsted Yarns
All numbers on Hand and Made to Order

O. S. HAWES & BRO.,
WEAVING and HOSIERY YARNS,
All Plies and Numbers.
Imported Yarns a Specialty
82 and 84 BEDFORD ST., FALL RIVER, MASS

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON WARPS
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 42s and above. AND
FITCHBURG, MASS. WARPS

E. Jenckes Manufacturing Co.
COLORED COTTON YARNS.
Cops and Cones.
PAWTUCKET, - R. I.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

SILK LUSTRE COTTON YARNS

In single and two or more plys. This yarn retains its lustre through all usages and is increased in strength twenty to forty per cent.

High Grade **COTTON WARPS** and **NOVELTY YARNS.**

Printers of Cotton, Wool and Worsted Yarns.

The J. R. MONTGOMERY CO.,

. . . . . WINDSOR LOCKS, CONN.

Cotton Yarns AND **WARPS** Of Every Description.

James F. White & Co.

COMMISSION MERCHANTS,

54 an 56 Worth St., NEW YORK.

228 Chestnut St., PHILADELPHIA.

BURLAPS all WIDTHS and WEIGHTS.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double and Twist,

COTTON WARPS

4s to 60s.

HOUSATONIC, MASS.

Hosiery AND Weaving Yarn

ALBERT IVINS CROLL, BOSTON

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade.

PAWTUCKET, R.I.

Continued from page 131.

cents for 2/40s and $1.05 for 2/50s, with the prospect of still higher prices. The spinners have the trade and the prices asked must be paid. In the face of these facts a certain commission house suggested an advance of 5 per cent. The manufacturer to whom this suggestion was made laughed at the idea and said that unless he could get the full advance for yarn, he would shut down his mill. There has been much talk of weavers and knitters owning large quantities of stock. We have no doubt that there are certain large mills who may own one year's supply, but the vast number of smaller mills do not own six month's supply of yarn or wool, and if business starts brisk the stocks in the hands of manufacturers will not last four months. Under the former McKinley tariff all the mills were running, and now we have the McKinley tariff back again, with fewer mills to handle the demand for fabrics. Why should we not have a boom? Spinners are in some instances refusing to sell stocks on hand until the market has advanced still further. The demand for luster yarn is somewhat limited, although there are new mills making this class of fabric in large quantities. The older mills have been left in the race this time. The knitting trade is still late, although orders are now beginning to come forward. Worsted hosiery is especially late and many of the knitters using French spun worsted yarn have contracts with spinners which are running out. The result is that when they buy more yarn, prices will be much beyond their reach. Fancy worsteds are in demand and the trade is short, as few were imported. Therefore, this important branch of the worsted industry is entirely in the hands of the domestic weavers, who, by the way, got a horrible deal at the hands of Congress, on the worsted yarn schedule. We will be able to quote position and prices in our next issue.

Continued on page 135.

KERR THREAD CO.
—SPINNERS OF—
Fine Combed Sea Island **COP SINGLES**
All Numbers, 30s to 150s.
Fall River, Mass.

WOOLEN AND MERINO
YARNS. Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER, - MASS.

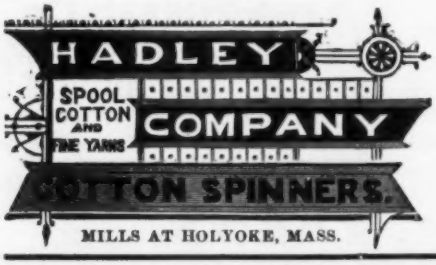
A. HERBST. J. W. JONES.
HERBST & JONES,
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
488-492 Broadway, NEW YORK.
COTTON WOOL SILK **YARNS** For Weaving Knitting or Embroidering.
HARNESS TWINES.

YARNS All Numbers and Qualities.
HOLLAND & WEBB,
478 Broadway, New York.

NEW ENGLAND THREAD CO.
PAWTUCKET, R. I.
Manufacturers of Spool Cotton & Supefine Tapes
Thread and Yarn on Tubes and Cones for the Hosiery trade etc. Thread dressing a specialty, for weaving purposes. Dyers and Bleachers of Threads, Yarns and Tapes.



SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

Cotton Warps.
WHITTIER COTTON MILLS,
LOWELL, MASS.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & CO., Philadelphia and Boston.

Woolen Yarns
Single, also Double and Twist for Weaving Hosiery. Covert Cloth Yarns a specialty.
Raw Stock and Piece Dyeing.
CLEAR RIVER MILLS, PASCOAG, R. I.

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

BOTANY WORSTED MILLS,
PASSAIC, N. J.
Fine Worsted Yarns,
— AND —
Fine Woolen Yarns
— IN THE —
GREY, COLORS and MIXTURES.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

FIRE DEFIED!! By The American Fire-Resisting Paint.
A building protected with these goods becomes practically Fire proof.
An ocular demonstration of the fire-resisting qualities of this paint and kalsomine will be given at our office to anyone interested. Samples, and information furnished from those who have used this paint successfully.
THE AMERICAN FIRE-RESISTING PAINT CO., 17 Broadway, New York, N. Y.

GLUTROSE.
Glutrose Sizing will effect a saving of 25% to 30% of flour or starch.
Glutrose Sizing will penetrate the goods better, go farther and finish better than anything else, adding much to the strength, stiffness and lustre of the goods.
Glutrose Sizing has no offensive odor, and goods prepared with it will retain their condition better under severe climatic changes.
Glutrose is a neutral compound and **will not injure colors.**
Manufactured solely by AMERICAN GLUTROSE WORKS,
Office, Penn Mutual Building, - 925 Chestnut Street, - PHILADELPHIA, PA.

(Continued from page 133.)

The Philadelphia Yarn Market.

The market has been very firm and generally advancing, the past month, on most yarns. The extreme scarcity of cotton in the South has created an involuntary bond between all spinners, so that without any particular arrangement, they have all put their prices up and insisted on getting an advance, because they are obliged to. The production has also been curtailed, and the demand has probably been somewhat better. The greatest advance is probably shown in the staple yarns, which go the lowest in dull times, and consequently advance more when there is a good demand. We quote for cotton yarns:

WARPS.

20/1	14 to 14½ cts.
22/1	14½ to 15 cts.
26/1	15½ cts.
12/2	13½ to 14 cts.
14/2	14 to 14½ cts.
14/1	13½ to 14 cts.
16/1	14 cts.
30/2 Eastern	19 to 19½ cts.
30/2 Southern	18½ to 19 cts.

SKEIN.

26/1	15 to 15½ cts.
20/1	14 cts.
19/1	13¾ to 14 cts.
4s to 10s soft	12½ to 13 cts.
10s to 12s hard	12½ to 13 cts.
12s soft	13 to 13½ cts.
14s soft	13 to 13½ cts.
16/1	13 to 13½ cts.
20/2	15 to 15½ cts.
14/2 hard	13½ cts.

SOUTHERN CONES.

6s to 8s	13 to 13½ cts.
10s	13½ to 14 cts.
12s	14 to 14½ cts.
14s	14½ to 15 cts.
16s	15 to 15½ cts.
20s	15½ to 16½ cts.
24s	16 to 17½ cts.
26s	16 to 17½ cts.

SHUTTLE COPS.

6s to 8s	13 to 13½ cts.
10s	13½ cts.
12s	13½ to 14 cts.
16s	14 to 14½ cts.
26s Eastern	14½ to 15 cts.
40s "	18 to 19 cts.

B. F. BOYER & CO.,

Successors to GEORGE SHIMER & BOYER,

HOSIERY YARNS,
In Wool, Merino and Worsted.

GOLF YARNS,
In Wool and Worsted. Also carry a full line

BUNDLE YARNS
For the Jobbing Trade.

516 Market St., Philadelphia.
MILLS, CAMDEN, N. J.

PORTER BROTHERS & COMPANY

Commission Merchants,
Trimmings, Buttons and Knit Underwear.
Sole Agents for
John Paton, Son & Co.,
OF ALLOA, SCOTLAND.
Specialties:
SCOTCH MIXTURES
For Sweaters, Golf and Bicycle Hose, Mitts, Gloves, etc.
78 & 80 Worth St., New York.
72-82 Lincoln St., Boston.

MIXED COLORED CONES.

6s to 8s	14 to 14½ cts.
10s	14½ to 15 cts.
12s	15 to 15½ cts.
14s	16 to 16½ cts.

EASTERN COPS.

12s shuttle	14½ to 15 cts.
10s to 12s hosiery	14 to 14½ cts.
14s to 16s hosiery	15 to 15½ cts.
20s	16 to 16½ cts.
24s	16½ to 17½ cts.

SKEIN.

8/3 carpet	12½ to 13 cts.
8/3 slack	13 cts.
9/4 slack	13 cts.
10s double reeled	13 to 13½ cts.
16/3 slack	14 cts.
16/4 medium	14 cts.

Eastern skein, 1-2 c. above cops.

Eastern cones, 1-2 c. to 1 1-2 c. above cops.

Egyptian, carded, 4 c. above white.

Egyptian, combed, 4 c. above carded.

Woolen spinners are somewhat more hopeful on account of the tariff bill

(Continued on page 137.)

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:
Broadway and Jefferson Avenue,
CAMDEN, NEW JERSEY.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.
Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

The Competition of Foreign Goods

On staple and plain fabrics under present tariff conditions makes it almost impossible to make any money, and the only hope of profit in making Dress Goods, Cloakings and Cassimeres seems to be in using

MOHAIR OR NOVELTY YARNS.

In the United States we are the only manufacturers from raw materials to finished product who make such yarns ONLY.
Perhaps we can be of use to you.

CRANSTON WORSTED MILLS, Bristol, R. 1

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

(Continued on page 135.)

which has just been signed, although it has had little effect as yet except on the price of raw stock. Prices are nominal, and there is no standard upon which to make an intelligent quotation, as the same size may be spun in many different qualities, which make different prices.

—A recent French invention has been before manufacturers in Europe, for polishing woven fabrics. Its object is to give to silk, cotton, or mixtures a certain opacity or shaded effect by causing the peculiar appearance which they present after weaving to disappear, at the same time retaining or improving their touch and appearance. This result is obtained by polishing the fabric in the loose or unstretched condition and placed upon an elastic support. The polishing is effected by means of a series of revolving discs provided with blades and conveniently distributed above this support; but the fabric, being loose, would be drawn along by the movement of these blades if recourse were not had to a special holding contrivance which, by pressing at the desired time upon the fabric, prevents this drawing action.

—An importation was recently made of "artificial silk," in skeins, which has come before the United States General Appraisers, upon which a duty has been assessed of 45 per cent ad valorem, under Paragraph 15, Tariff Act, 1894, as a compound of pyroxyline, a form of solid collodion.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

LARGEST IN THE WORLD. ESTABLISHED IN 1870.

THE F. MUHLHAUSER CO.

FINE SHODDIES, CAPACITY: 10,000,000 lbs. per Annum

Rings, Threads, Botany Yarns, Etc.

BRANCH OFFICES: 143 Federal Street, Boston. 7-9 Grand Street, Troy, N. Y. 34 No. Front Street, Philadelphia, Pa.

CLEVELAND, OHIO.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silks for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479, and 481 Broome Street, NEW YORK.
79 Chauncey Street, BOSTON.
186 Franklin Street, CHICAGO

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., - NEW YORK.

Boston Finishing Works

WILLIAMSTOWN, MASS.

BLEACHERS, DYERS AND FINISHERS

Of Pure Finish Shirtings, Sheetings, Canton Flannels and Filled Goods. Also Silesias, Satteens, Corset Jeans, Cambrics, Sleeve Linings, Pocketings, Flanneletts, and all descriptions of Dyed Goods.

NAPPING A SPECIALTY.

Being equipped with the French and other Foreign and Domestic Napping Machines, we are prepared to give any kind of Nap required, including the French FiannelFinish.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Pawtucket Dyeing & Bleaching Co.,

BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,
28 BAYLEY ST., PAWTUCKET, R. I.

FAST COLORS

For Wool, Woolen and Cotton Yarn and Piece Goods Dyeing, and for Calico Printing

ALIZARINE RED, PASTE AND POWDER.

Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
Cœruleine, Galleine, Mythylene Grays.
Thionine Blues, Thionine Indigo, Solid Green and
PATENT BLUES (superseding Extracts of Indigo on account of fastness and color bloom) for Wool and Silk, Benzidine and Primuline Colors, Zinc Dust, Aniline Salts and Oil.

VICTOR KOECHL & CO. 79 MURRAY ST. NEW YORK.

SOLE AGENTS FOR

FARBWERKE, formerly MEISTER, LUCIUS & BRUENING, HOECHST o | M.; A. LEONHARDT & CO., Muehlheim o | M.

BRANCH OFFICES:

Boston, Mass., 138 Milk St.; Philadelphia, Pa., 39 N. Front St.; Providence, 45 S. Main St.

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: **Philadelphia, 546 Bourse Building.**
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: **Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.**

R. GREENWOOD & BAULT,

GLOBE DYE AND BLEACH WORKS,

FRANKFORD, - PHILADELPHIA.

Specialists in Cotton Warps and Skein Dyeing.

BAY STATE DYEING AND FINISHING CO.,

Yarn and Piece Dyeing a Specialty.

NORTH ANDOVER, DEPOT, - - MASS.

JOHN J. KELLER & CO.,

104 and 106 MURRAY STREET,
NEW YORK.

220 Church St., Philadelphia. 135 Pearl St., Boston.

Aniline Colors,
Dyewood Extracts,
Sumac and
Nutgall Extracts.

FAST COLORS for wool dyeing, one dip cotton colors, novelties and specialties for calico printing.

—— MANUFACTURED BY ——

JOHN R. GEIGY & CO., Basle, Switzerland.

Wm. J. Matheson & Co., Ltd.

IMPORTERS AND
MANUFACTURERS OF

DYE STUFFS

New York,
Boston,
Philadelphia,
Providence,
Charlotte, N. C.,
Montreal, Canada.

FARBENFABRIKEN OF ELBERFELD CO.

77 William Street, New York. *68 Batterymarch St., Boston.*
11 North Front Street, Phila. *145 Kinzie Street, Chicago.*

Aniline Colors, Alizarine, Dyestuffs.

SOLE IMPORTERS OF THE WELL KNOWN ALIZARINE AND DIRECT DYEING BENZIDINE COLORS,

—— MANUFACTURED BY ——

FARBENFABRIKEN, formerly FRIEDR. BAYER & COMPANY, Elberfeld and Barmen, Germany.

Sole Agents of the Hudson River Aniline Color Works, Albany, N. Y

BLEACHERS:

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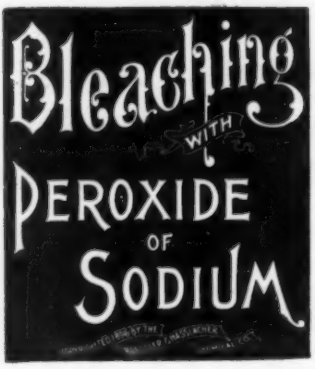

Having started our Peroxide Works at Niagara Falls, we are prepared to execute the largest contracts promptly, and at greatly reduced prices.

The Roessler & Hasslacher Chemical Company,

100 William Street, Woodbridge Building,
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THE STAMFORD MANUFACTURING CO.

MANUFACTURERS OF

CUT and GROUND DYEWOODS,

Dyewood Extracts and Liquors,

FLAVINES.

Importers of CHEMICALS and DYESTUFFS.

188-187 Front Street, - New York.

NEW COLORS

Of the St. Denis Dyestuff and Chemical Company.

BROWN S D P, . . .

New Direct Dyeing Brown for Cotton,

Specially recommended to Hosiery Manufacturers.

SOUDAN BLACKS FOR WOOL,

Dyeing in an Acid Bath. Fast to Light and Milling.

SYKES & STREET,

New York. Boston. Philadelphia.

SOLE U. S. AGENTS.

O. S. JANNEY & CO.,

IMPORTERS OF

INDIGO, CUTCH, GAMBIER, SICILY SUMAC, ANILINES, ETC.

AND DEALERS IN

Dyestuffs, Extracts and Chemicals.

No. 70 Kilby Street, BOSTON.

No. 8 and 10 Letitia Street, PHILADELPHIA.

New York and Boston Dyewood Company,

MANUFACTURERS OF

DYEWOOD EXTRACTS.

Sole Agents for the United States and Canada for

ACTIEN-GESELLSCHAFT FUR ANILIN-FABRIKATION, BERLIN.

Specialties for Wool, Silk and Cotton.

BENZO PURPURINE B, 4 B, 6 B; BRILLIANT PURPURINE R; BRILLIANT CONGO R, etc.

CHROME FAST BLACK B, a new fast black for wool.

NEW YORK: 55 BEEKMAN ST. PHILADELPHIA: 124 ARCH ST.
BOSTON: 117 HIGH ST. HAMILTON, ONTARIO.

A. KLIPSTEIN & COMPANY,

122 PEARL ST., NEW YORK.

Chemicals and Dyestuffs,

ANILINE COLORS.

FAST COLORS FOR WOOL.

BRANCHES:

50-52 North Front Street, Philadelphia, Pa.
283 285 Congress Street, Boston, Mass.
124 Michigan Street, Chicargo, Ill.

American Aniline Colors FOR Cotton, Wool and Silk.

THE HANNA-SCHOELLKOPF CO., Philadelphia.

New York. Established 1865. Philadelphia.

ANCHOR COLOR MANUFACTURING CO.,

HAVANA COLORS FOR COTTON.

ALIZARINE AND MAZARINE COLORS for Wool, Yarn and Piece-Goods.

One-Dip Blacks and One-Dip Blues for Mixed Goods.

Lactic Acid, Alizarine Mordant, Archil Liquor, Cudbear, Extract Indigo, Indigotine'

ACID BLACKS.

462, 464, 466 Cherry Street, New York.

PHILADELPHIA Office: 109 N. Front Street.

C. BISCHOFF & CO.,

87 and 89 Park Place, New York. Branches, 139 S. Front St., Phila. 104 Broad St., Boston.

Aniline and Alizarine Colors, Dyestuffs, Chemicals,

ANILINE OILS AND SALTS.

LATEST SPECIALTIES.

Cresylblue, OB pat'd.	For Cotton: absolutely fast to Sunlight.	Thio Versuvine, 3BB.	One dip for cotton and mixed goods, wool and cotton silk and cotton.		
" BB "		" Brown, BB.			
" RR "		" Yellow, R.			
Cresylviolet "		" Orange, G.			

Naphtazine Blue (Pat.)—a fast acid Navy Blue for Wool.

FAST DIRECT BLUES, Pat'd. for Cotton and Mixed Goods. Wool and Cotton, Silk and Cotton.

FAST DIAZOTABLE BLACKS, PAT'D.

Established 1834. H. G. JOHNSON, Proprietor.

Wm. G. Johnson Co.

Manufacturers of

DYEWOODS

Logwood Extracts, - - -
Ground and Bolted Camwoods
And other Fancy Woods. -

All Goods Warranted Uniform.

Long Distance Telephone. **UNCASVILLE, CONN.**

Fuller's Earth without Grit,

IMPORTED SOLELY BY

A. de RONDE & CO.,

254 FRONT STREET, NEW YORK.

Woolens washed with Patent Refined Fuller's Earth are much more durable and handle much softer than those cleansed by soaps and other means. ∴ ∴ ∴ ∴

For practical proof of these facts address as above, or

H. N. GARRETT, A. M., INST. C. E.,
101 Sydney Place, . . . Bath, England.

Proprietor of the Midford Fuller's Earth Refining Works.

F. E. ATTEAUX & CO.,

Manufacturing Chemists.

Inventors and Manufacturers of Specialties for Wool, Cotton, Silk and Leather Dyers.

Importers of Aniline and Alizarine Colors, Dyestuff and Chemicals.

Our well known specialties can **only** be furnished by us or through our authorized agent, HANNA-SCHOELKOPF CO., 135 No. Water St., Philadelphia.

OFFICE AND SALESROOM,

174 & 176 PURCHASE ST., - BOSTON.

WORKS, W. FIRST, D AND CYPHER STS., SOUTH BOSTON.

The STONE & WARE CO.,

IMPORTERS AND MANUFACTURERS

COLORS, DYESTUFFS, EXTRACTS AND CHEMICALS.

Special Colors and Chemicals for all Purposes.

INFORMATION AND SAMPLES CHEERFULLY FURNISHED.

145 Kinzie Street, CHICAGO. | 157 Maiden Lane, NEW YORK. | 105 Reed Street, MILWAUKEE.

READ HOLLIDAY & SONS, Ltd.,

No. 100 William Street, - New York.

Manufacturers of **Acid Magenta.** (Patented.)

Specialties: Acid Blacks for Wool, and One Dip Dyes for Cotton.

Aniline Dyes, Aniline Oil, Aniline Salts, Arseniate of Soda, Chlorate of Potash, Yellow Prussiate of Potash, Indigo, Indigo Extract, Archil Liquor, Cudbear, Picric Acid, Zinc Auxiliary, Chemicals, Etc.

Works: Huddersfield, Eng., Brooklyn, N. Y. Branches: BOSTON, 125 Pearl St., PHILA. 61 N. Front St.

F. G. PAULY, Pres. I. J. MERRITT, Vice Pres. I. J. MERRITT, Jr., Treas

Harway Dyewood & Extract Manufacturing Co.,

MANUFACTURERS OF

DYEWOODS, DYEWOOD EXTRACTS and LIQUORS, HAEMATINE

ONE DIP BLACK DYE, CUTCH EXTRACT.

Importers of Indigo, Cutch, Madder, Chemicals, &c.

WORKS: FLUSHING, L. I. **184 Front St., NEW YORK.**

BOSSON & LANE,

ANTI-CHLORINE *FOR BLEACHING COTTON. NO ACID. NO SOAP.*

Dyestuffs, Chemicals and Aniline Colors.

36 CENTRAL WHARF. BOSTON, MASS.

ESTABLISHED 1863.

KALLE & CO.

Manufacturers of **Aniline Colors,** BIEBRICH ON RHINE, GERMANY.

77 JOHN STREET, NEW YORK.

PHILADELPHIA, 115 & 117 South Front Street. BOSTON, 463 Atlantic Avenue.

OAKES MANUFACTURING CO.,

Manufacturers and Importers of

Pure Extracts of Dye Woods and Dye Liquors,

58 STONE & 93 PEARL STS., NEW YORK.

Boston, 58 Pearl St. Atlanta, 123 Marietta St. Philadelphia, 113 Chestnut St.

Archil, Fustic, Sumac, Hypernic, and Cutch Extracts.

Genuine Hematine, Either Liquid, Paste or Solid

BEACH & COMPANY,

Hartford, Conn., and 372 & 374 Atlantic Ave., Boston, Mass.

Proprietors GROVE WORKS DYEWOOD MILLS.

Agents British Alizarine Co., Brooks, Simpson & Spiller, Anilines, Edward Mucklow's Dyeing Extracts, J. R. G. Cochineal, Etc.

Extracts of Indigo, Indigo Carmine, Indigotine, Gendarme Blue, Refined and Reduced Indigo, Dressings and Finishings,

Bisulphite of { **Soda, Chrome, Iron.**

Alizarine Assistant, Sulphoricinate, Soaps.

JAECK BROS.

62-68 North 11th St., Brooklyn, N. Y.

Cutch & Gambier Extracts, Indigo Substitute, Steam Black, Acetate of Chrome, Chlorogen, Sucrosine, Peroxyde of Hydrogen.

All products guaranteed strictly pure.

THE SHARPLESS DYE-WOOD EXTRACT CO.,

OFFICES: 648, 650, 651 The Bourse, PHILADELPHIA.

Warehouse: 22 N. Front St., PHILADEDPHIA. Works: CHESTER, PA.

—MANUFACTURERS OF—

DYEWOODS AND EXTRACTS.

LOGWOOD.
FUSTIC.
BARK.
BLACK DYE.
CUTCH.

S. J. COREY

Dyestuffs and Chemicals. Phthalein, Alizarine and other Fast Colors for Cotton, Wool and Silk. Shades matched and full particulars sent on application. Indigo, Dyewoods and Extracts, Nubia One-Dip Fast Black for Woolens, Lion Ammonia Wool Scourer, &c. Agt. for Stutz & Co., London; W. F. Stutz, Calcutta; and Williams & Co., Madras.

273 Congress St., Boston, Mass.

DYESTUFFS

T. C. ASHLEY & CO.

Importers and Manufacturers of

DYE STUFFS AND CHEMICALS,

145 Milk Street,

Works at Walpole, Mass. **BOSTON.**

Telephone 1580.

Webster Job Dye Works.

Dyeing Silk, Worsted, Cotton and Wool in Skeins, Raw Stock, Tops, Slubbing, Rags and Piece Goods. Specialties in Alizarine and Indigo Colors and Fast Black on Cotton. All work warranted.

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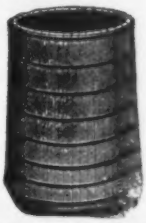

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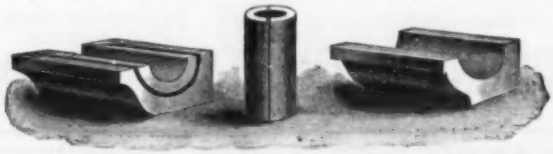

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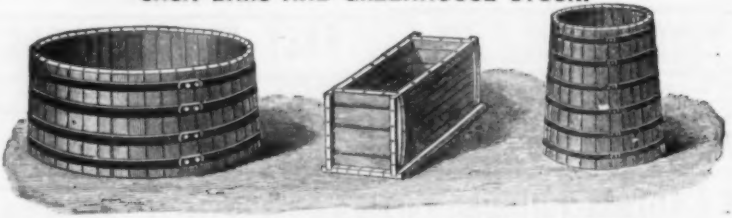

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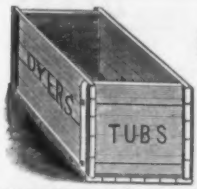

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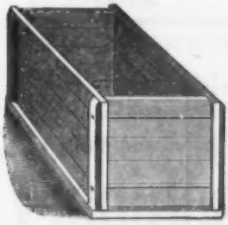

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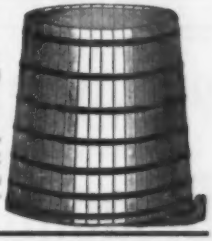

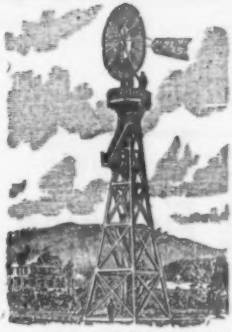

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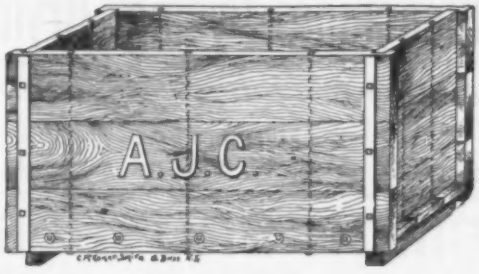

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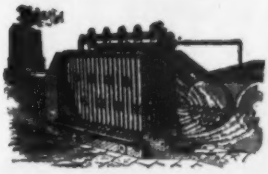

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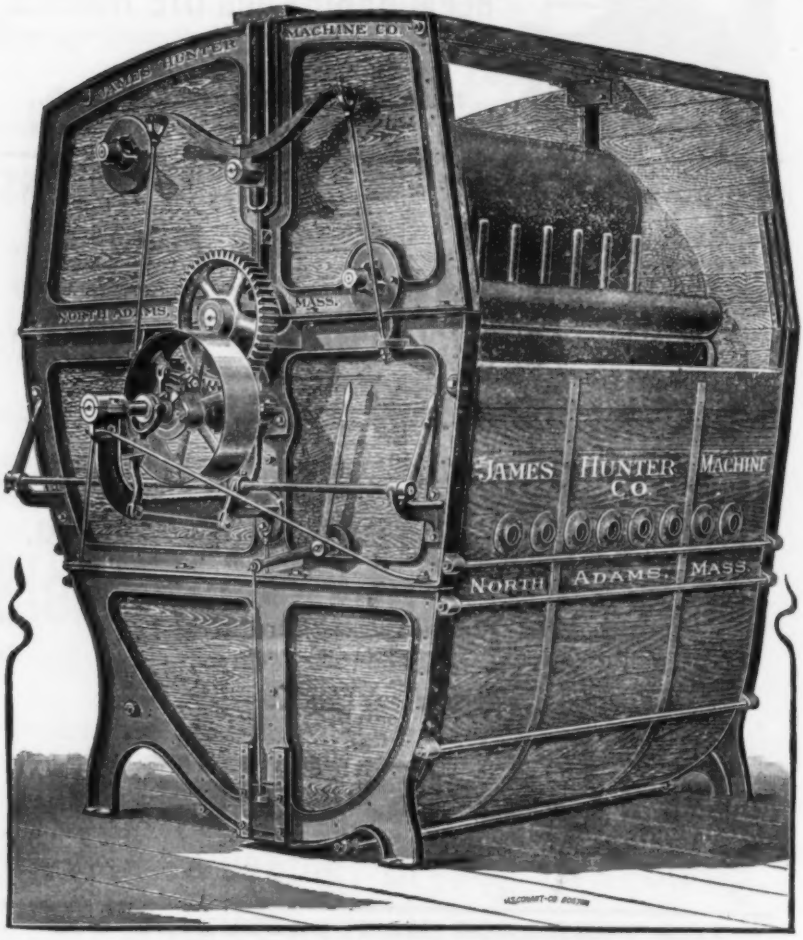

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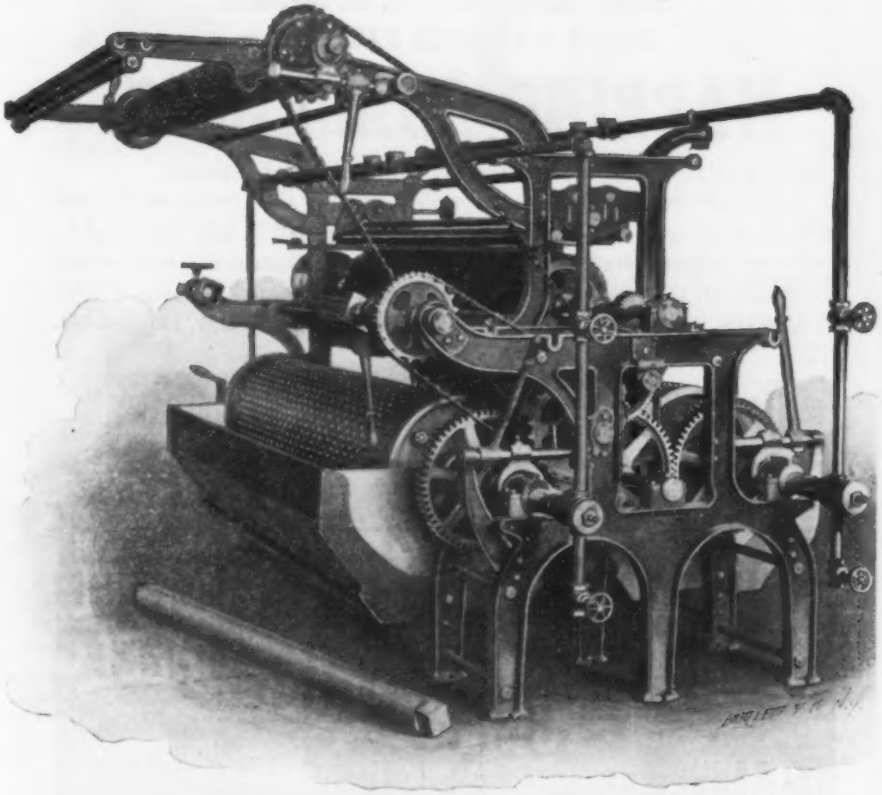

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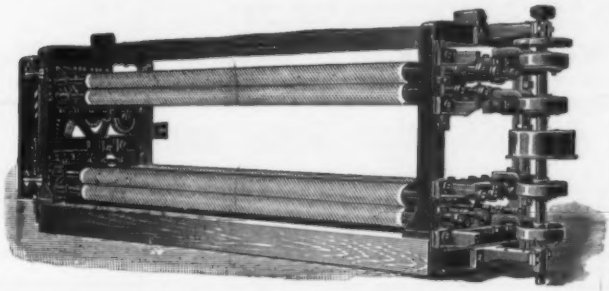

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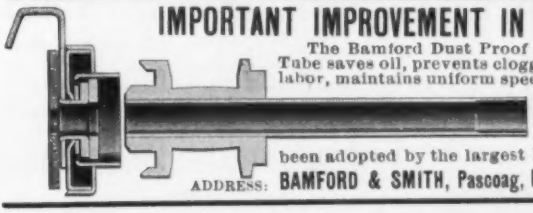

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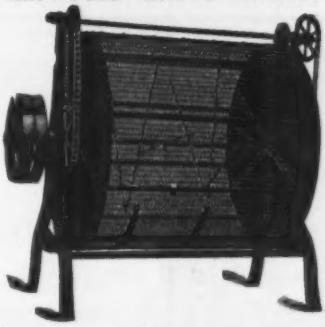

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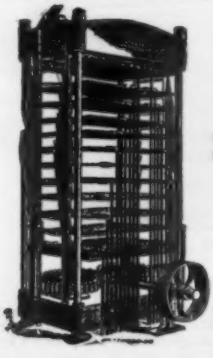

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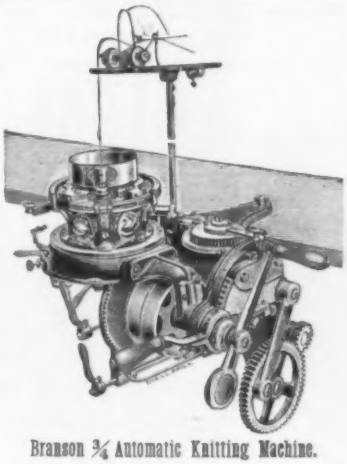

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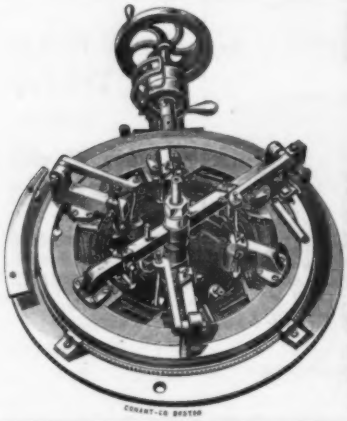

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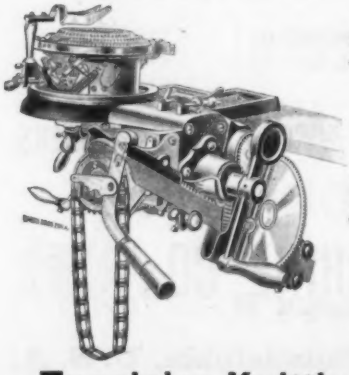

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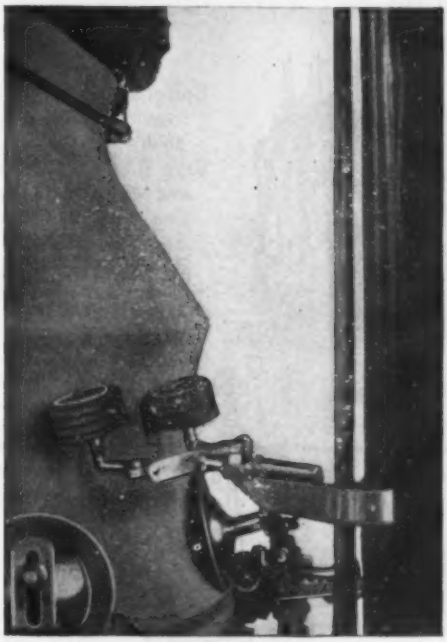

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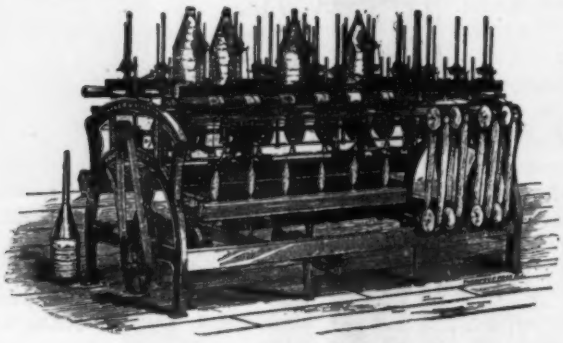

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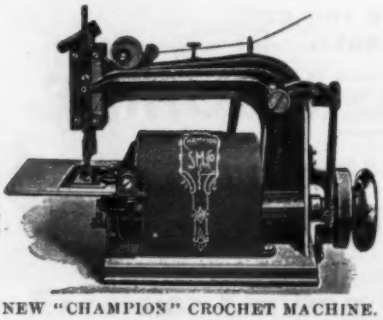

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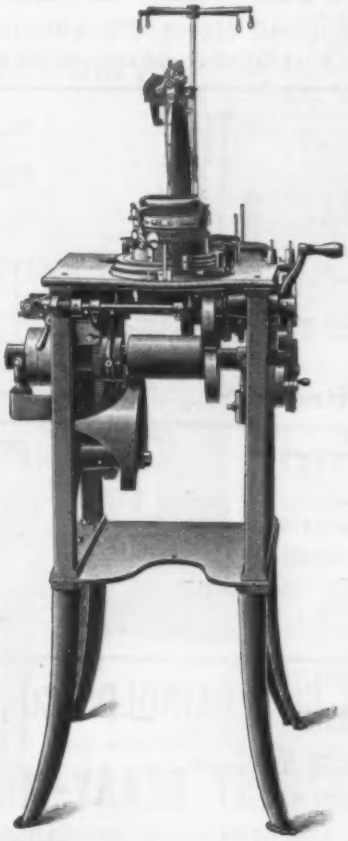

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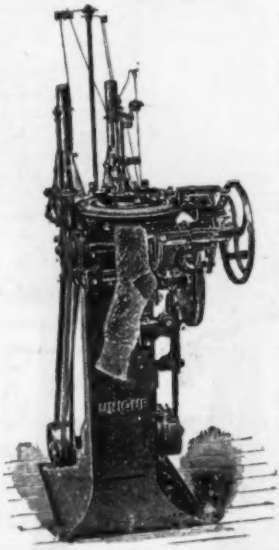

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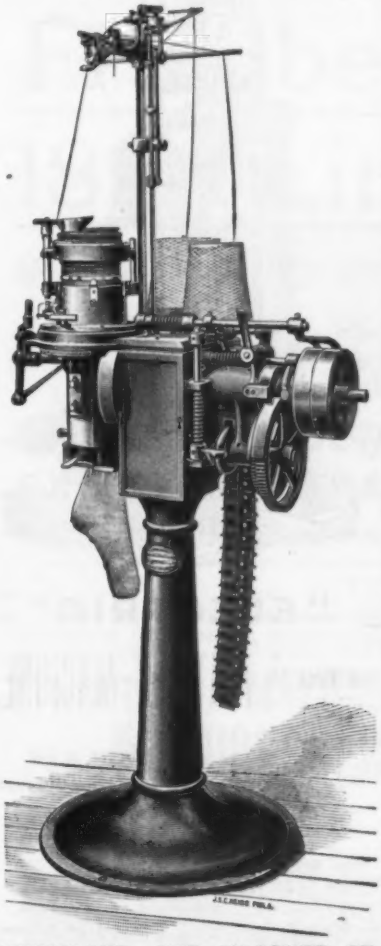

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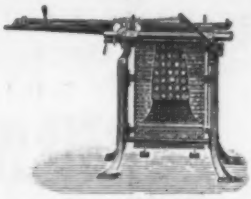

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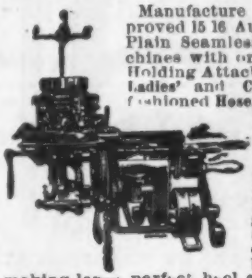

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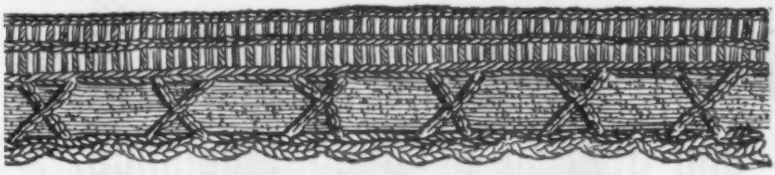

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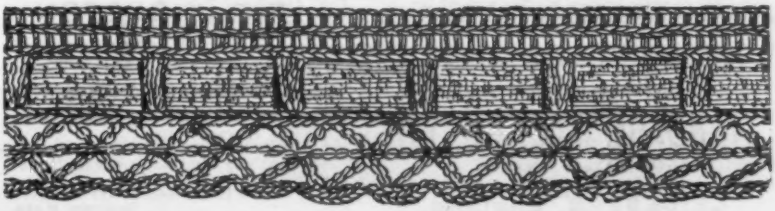

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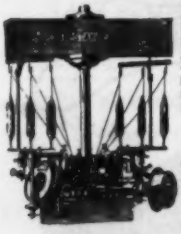

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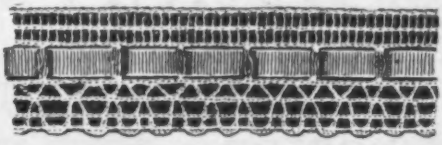
Lace  Edgings

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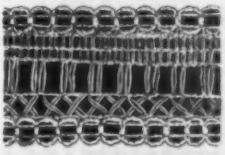

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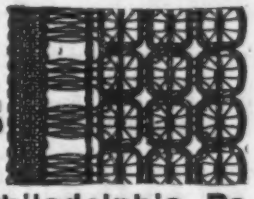

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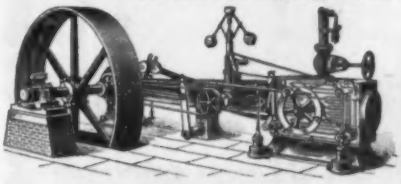

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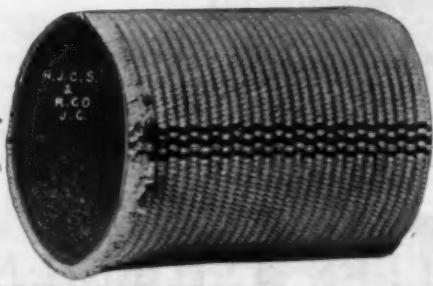

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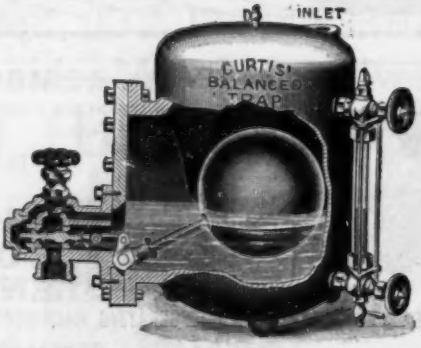

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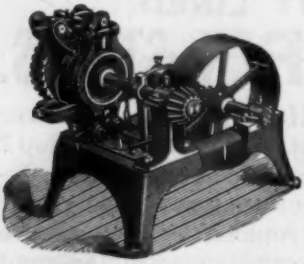

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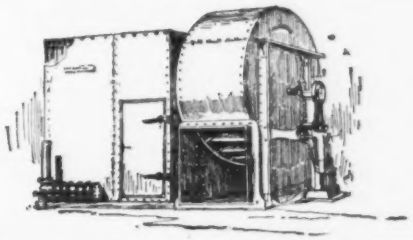

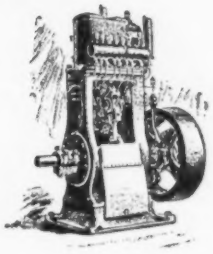

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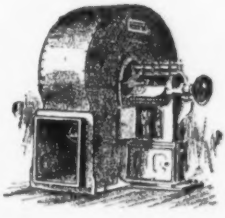

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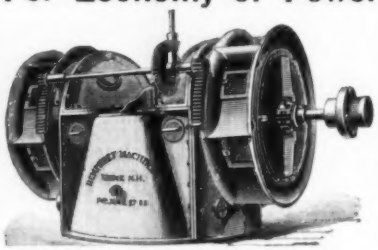

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